NAVSHIPS 92890

11A

TECHNICAL MANUAL

for

R.F. SIGNAL GENERATOR SET AN/URM-26B

TRAD ELECTRONICS CORPORATION
ASBURY PARK, NEW JERSEY

DEPARTMENT OF THE NAVY
BUREAU OF SHIPS

TEMPORARY CORRECTION T-6 to TECHNICAL MANUAL
for RF SIGNAL GENERATOR SET AN/URM-26B
NAVSHIPS 92890

This temporary correction is in effect upon receipt.

This temporary correction changes the technical manual to reflect a production change in equipments supplied under Contracts NObsr-81404 and NObsr-87368

PAGE NO.	CHANGE IN EFFECT	PARA & LINE or FIGURE & LOCATION	ACTION
1-1	T-4	1-2. c	Under line (9) add "See T-4 and T-6" and refer to the following: (13) Adapter Connector UG-605/U
1-3	T-4	Table 1-1	Add "1 Adapter Connector UG-605/U"
1-3	Original	Table 1-2	Change Anti-fm diode from "CK710" to "1N82A"
7-3	T-4	Table 7-1	Change CR 102 as follows: "CRYSTAL UNIT, rectifying: Type 1N82A" Delete Capacitor C-127 Add Capacitor C-138 as below "CAPACITOR, fixed mica dielectric, 680 μμfd, ± 10%, 500V, CM20B681K"
6-15, 6-16	Original	6-16	Delete Capacitor C-127 Add Capacitor C-138, 680 μμfd from pin 5 to pin 6 of V-102 Change CR 102 from type CK710 to type 1N82A
4-4	Original	4-4	Add Capacitor C-138, 680 μμfd from pin 5 to pin 6 of V-102
4-7	Original	4-8	Add Capacitor C-138, 680 μμfd from pin 5 to pin 6 of V-102
4-8	Original	4-9	Add Capacitor C-138, 680 μμfd from pin 5 to pin 6 of V-102
5-9	Original	5-5	Add Capacitor C-138, 680 μμfd from terminal 1 to terminal 2 of T-101
6-5	Original	6-4B	Delete Capacitor C-127

Insert this temporary correction in the technical manual immediately after the front cover and preceding T-5.

TEMPORARY CORRECTION T-5 TO TECHNICAL MANUAL FOR
RF SIGNAL GENERATOR SET AN/URM-26B
NAVSHIPS 92890

This temporary correction is in effect upon receipt.

This temporary correction changes the technical manual to reflect a production change in equipments supplied under Contracts NObsr-59607 and NObsr-71785.

Make the following pen and ink corrections in technical manuals accompanying equipments bearing serial numbers 660 and higher.

PAGE NO	CHANGE IN EFFECT	PARA & LINE or FIG. & LOCATION	ACTION
6-15,6-16	Original	6-16, Top, Center	Under "R118", delete "2.5K", insert "1K".
7-7	Original	Table 7-1	In Name and Description column, opposite "R118", delete "2.5K", insert "1K", delete "JLU-2521SD4040L", insert "JLU1021SD4040L".
7-13	Original	Table 7-2	Opposite "R118", delete "N5905-114-3341".
7-15	Original	Table 7-3	Delete "N5905-114-3341" and "R118".

Insert this temporary correction in the technical manual immediately after the front cover and preceding T-4.

TEMPORARY CORRECTION T-4 TO TECHNICAL MANUAL FOR
RF SIGNAL GENERATOR SET AN/URM-26B
NAVSHIPS 92890

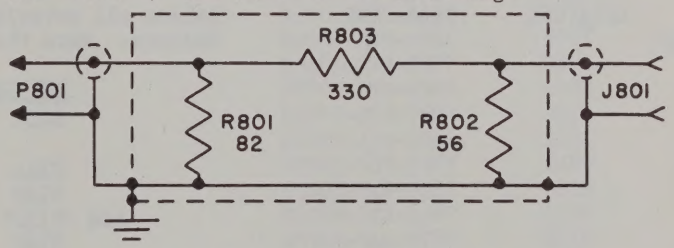
This temporary correction is in effect upon receipt.

This temporary correction changes the technical manual to reflect the addition of accessories provided with equipments supplied under Contracts NObsr-59607 and NObsr-71785.

Equipments bearing serial numbers 660 and higher include Fixed Attenuator CN-471/URM-26B. Equipments bearing serial numbers 769 and higher include Connector Adapters UG-201A/U and UG-255/U.

Make the following pen and ink corrections in technical manuals accompanying equipments bearing serial numbers 660 and higher.

PAGE NO.	CHANGE IN EFFECT	PARA & LINE or FIG. & LOCATION	ACTION
1-1	Original	1-2.c.	Under line (9), add "See T-4" and refer to the following: "(10) Fixed Attenuator CN-471/URM-26B."
1-2	Original	1-3	Following paragraph h, add "See T-4" and refer to the following: "i. Fixed Attenuator CN-471/URM-26B provides 10:1 attenuation when terminated in 70 ohms. The input impedance is 50 ohms. One end is terminated in a female BNC connector receptacle and the other end in a type N connector plug."
1-3	Original	Table 1-1	Add "1 Fixed Attenuator CN-471/URM-26B."
3-9	Original	3-11	Following paragraph f, add "See T-4" and refer to the following: "3-11A. USE OF FIXED ATTENUATOR CN-471/URM-26B. Fixed Attenuator CN-471/URM-26B has a 10:1 attenuation and may be used without correction in place of Fixed Attenuator CN-316/URM-26B with receivers whose input impedance is 70 ohms."
6-15,6-16	Original	6-16, Bottom, Right	Under the diagram of Fixed Attenuator CN-316/URM-26B, add "See T-4" and refer to the following:



FIXED ATTENUATOR CN-471/URM-26B

7-1	Original	7-6	Following "7-6. NOTES.", add "See T-4". Delete entire paragraph and refer to the following: "Following are the applicable Source Maintenance and Recoverability Codes: Code SM&R 2 AFFR 3 X2BBC 4 X1BBC 6 P1FFC All other items are coded P1FFC."

PAGE NO.	CHANGE IN EFFECT	PARA & LINE or FIG. & LOCATION	ACTION

7-2 through 7-10 — Original — Table 7-1

In the NOTES column, make the following changes:

REF DESIG	NOTES
C101	Insert "6".
C132	Delete "3".
E101	Delete "6".
E102	Delete "6".
E104	Delete "6".
L117	Delete "2", Insert "4".
R119	Insert "6".
R135	Insert "6".
C203-1	Insert "6".
W601B	Delete "6".

7-10 — Original — Table 7-1

Following W701B, add "See T-4" and refer to the following:

REF DESIG	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
Z801		ATTENUATOR, fixed: 10:1, CN-471/URM-26B, Trad Part No. 136-B-13	10:1 attenuator, 50 to 70 ohms matching
J801		CONNECTOR, receptacle; type UG-89B/U	p/o Z801
P801		CONNECTOR, plug: type N, Trad Part No. 136-B-25	p/o Z801
R801		RESISTOR, fixed: composition, 82 ohms ±5%, 1/2W, RC20GF820J	p/o Z801
R802		RESISTOR, fixed: composition, 56 ohms ±5%, 1/2W, RC20GF560J	p/o Z801
R803		RESISTOR, fixed: composition, 330 ohms ±5%, 1/2W, RC20GF331J	p/o Z801

7-11 through 7-14 — Original — Table 7-2

Delete all asterisks(*) preceding Federal Stock Numbers. Make the following changes:

REF DESIG	FEDERAL
C101	Delete "N5910-114-2431", Insert "N5910-112-8171".
C114	Insert "N5910-668-9335".
C122	Insert "N6625-504-1029".
Add "C128"	Insert "N5910-284-4050".
C129	Insert "N5910-543-0086".
C130	Delete "*N5910-643-8981", Insert "N5910-518-0819".
Add "C132"	Insert "N5910-553-4845".
Change "C203" to "C203-1"	Insert "N5910-642-6499".
Add "J801"	Insert "N5935-204-9809".
L121	Delete "N5999-501-7400", Insert "N5950-284-5732".
R108	Delete "*N5905-192-0667", Insert "N5905-279-2522".
R109	Delete "*N5905-642-1099", Insert "N5905-539-2029".

PAGE NO.	CHANGE IN EFFECT	PARA & LINE or FIG. & LOCATION	ACTION

7-11 through 7-14 — Original — Table 7-2

REF DESIG	FEDERAL
R110	Delete "*N5905-279-4991",
	Insert "N5905-646-5770".
R119	Delete "N5905-108-6483",
	Insert "N5905-549-9488".
R121	Insert "N5905-279-3502".
R124	Delete "*N5905-171-2004",
	Insert "N5905-185-8510".
Add "R127"	Insert "N5905-195-6453".
R130	Insert "N5905-552-3477".
Add "R134"	Insert "N5905-299-2046".
Add "R135"	Insert "N5905-249-4210".
Add "R136"	Insert "N5905-252-5434".
Add "R801"	Insert "N5905-279-1894".
Add "R802"	Insert "N5905-279-1897".
Add "R803"	Insert "N5905-192-3971".
W601A	Delete "*N5935-149-4066",
	Insert "N5935-258-4422".
Z101	Insert "N5915-501-4362".
Z501	Delete "N5915-547-1541",
	Insert "N5915-520-8468".

7-15,7-16 — Original — Table 7-3

Delete the following Federal Stock Numbers and reference designations:

N5905-108-6483	R119
N5905-171-2004	R124
N5905-192-0667	R108
N5905-642-1099	R109
N5910-114-2431	C101
N5910-643-8981	C130
N5935-149-4066	W601A

Insert the following Federal Stock Numbers and reference designations in proper numerical sequence:

N5905-185-8510	R124
N5905-192-3971	R803
N5905-195-6453	R127
N5905-249-4210	R135
N5905-252-5434	R136
N5905-279-1894	R801
N5905-279-1897	R802
N5905-279-2522	R108
N5905-279-3502	R121
N5905-299-2046	R134
N5905-539-2029	R109
N5905-549-9488	R119
N5905-552-3477	R130
N5905-646-5770	R110
N5910-112-8171	C101
N5919-284-4050	C128
N5910-518-0819	C130
N5910-543-0086	C129
N5910-553-4845	C132
N5910-642-6499	C203-1
N5910-668-9335	C114
N5915-501-4362	Z101
N5915-520-8468	Z501
N5935-204-9809	J801
N5935-258-4422	W601A
N5950-284-5732	L121
N6625-504-1029	C122

Make the following pen and ink corrections in technical manuals accompanying equipments bearing serial numbers 769 and higher:

PAGE NO.	CHANGE IN EFFECT	PARA & LINE or FIG. & LOCATION	ACTION
1-1	Original	1-2.c.	Refer to the following: "(11) Connector Adapter UG-201A/U (12) Connector Adapter UG-255/U".
1-2	Original	1-3	Refer to the following: "j. Connector Adapter UG-201A/U is used to adapt type N female to type BNC male connectors. Connector Adapter UG-255/U is used to adapt type BNC female to type UHF connectors."
1-3	Original	Table 1-1	Add: "1 Connector Adapter UG-201A/U 1 Connector Adapter UG-255/U."
7-10	Original	Table 7-1	Refer to the following:

REF DESIG	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
P901		CONNECTOR ADAPTER: type UG-201A/U	Accessory
P1001		CONNECTOR ADAPTER: type UG-255/U	Accessory

7-12	Original	Table 7-2	Following P102, add: "P901 N5935-258-1763 P1001 N5935-149-3914".
7-15	Original	Table 7-3	In proper numerical sequence, insert the following: "N5935-149-3914 P1001 N5935-258-1763 P901".

Insert this temporary correction in the technical manual immediately after the front cover and preceding T-3.

TEMPORARY CORRECTION T-3 TO TECHNICAL MANUAL FOR
RF SIGNAL GENERATOR SET AN/URM-26B
NAVSHIPS 92890

This temporary correction is in effect upon receipt.

This temporary correction changes the technical manual to reflect production changes and is applicable to all models of RF Signal Generator Set AN/URM-26B bearing serial numbers 101 and higher. Equipments bearing serial numbers 1 through 100 are not affected; however, in the event C203 requires replacement, C203-1 may be substituted.

Make the following pen and ink corrections:

PAGE NO.	CHANGE IN EFFECT	PARA & LINE or FIG. & LOCATION	ACTION
4-9	Orig.	4-10, Top, Right	Delete "C203, 0.47UF", insert "C203-1, 0.22UF".
		4-7.a., Next to last line	Delete "C203", insert "C203-1".
5-3	Orig.	5-1, Center	Delete "C203", insert "C203-1".
5-4	Orig.	Table 5-4, Step 6	Under "Next Step", delete "C203" in line 8, insert "C203-1".
6-11	Orig.	6-11, Center, Right	Delete "C203", insert "C203-1".
6-12	Orig.	6-12, Bottom, Center	Delete "C203", insert "C203-1".
6-15,6-16	Orig.	6-16, Bottom, Center	Delete "C203, 0.47UF", insert "C203-1, 0.22UF".
7-9	Orig.	Table 7-1	In "Ref Desig." column, delete "C203", insert "C203-1". In "Name and Description" column, opposite "C203", delete "0.47 uf", insert "0.22 uf"; delete "CP11A3EE474K", insert "CP11A3EE224K".
7-11	Orig.	Table 7-2	In "Ref. Desig". column, delete "C203", insert "C203-1". In "Federal" column, opposite "C203", delete "N5910-644-0600". In "USAF" column, opposite "C203", delete "3330-056750768".
7-15	Orig.	Table 7-3	In "Federal" column, delete "N5910-644-0600". In "Ref. Desig." column, delete "C203".
7-16	Orig.	Table 7-3	In "USAF" column, delete "3330-056750768"; in "Ref. Desig." column, delete "C203".

Insert this temporary correction in the technical manual immediately after the front cover and preceding T-2.

TEMPORARY CORRECTION T-2 TO TECHNICAL MANUAL FOR
RF SIGNAL GENERATOR SET AN/URM-26B
NAVSHIPS 92890

This temporary correction is in effect upon receipt and is applicable to all models of RF Signal Generator Set AN/URM-26B.

This temporary correction changes the technical manual to reflect production changes.

Make the following pen and ink corrections:

PAGE NO	CHANGE IN EFFECT	PARA & LINE or FIG. & LOCATION	ACTION
4-4	Orig.	4-5 Center, Left	After "L121" add "& L122", change value from "3.3 UH" to "3 UH".
4-6	Orig.	4-7 Top, Right	Change value of R108 from "220K" to "150K".
4-7	Orig.	4-8 Bottom, Left	After "L121" add "& L122", change value from "3.3 UH" to "3 UH".
		4-8 Top, Right	Delete capacitor C108.
		4-4b Line 6	Change "choke L121 " to read "chokes L121 and L122".
		4-4b Last 3 lines	Delete last sentence.
4-8	Orig.	4-9 Bottom, Center	After "L121" add "& L122", change value from "3.3 UH" to "3 UH".
5-6	Orig.	5-3 Top, Right	Delete connections between C108 and S101, show C108 connected between center and lower terminals of R113.
		5-3 Top, Center	Add coil L122 in series with L121.
5-7	Orig.	Table 5-5, Step 8	In "Test Point" column, draw small circle around "B2".
6-4	Orig.	6-3 Bottom, Left	Under "L121" add "& L122".
6-8	Orig.	6-8 Bottom, Left	Under "L121" add "& L122".
		6-8 Center, Left	Extend arrow of "C108" to point to left hand side of R113.
6-15,6-16	Orig.	6-16 Center, Left	Delete capacitor C109. Change value of L121 from "3.3 UH" to "1.5 UH". Add Coil L122, 1.5 UH, in series with L121.
		6-16 Center, contact 8 of S101E	Delete capacitor C108.
		6-16 Top, Left	Add capacitor C108, 390 uuf, between ungrounded end of R113 and pin 7 of V102. Change value of R108 from "220K" to "150K".

PAGE NO	CHANGE IN EFFECT	PARA & LINE or FIG & LOCATION	ACTION
7-2	Orig.	Table 7-1	Opposite "C108", under "Locating Function", change to read "Modulation coupling capacitor, Figure 5-3".
7-5	Orig.	Table 7-1	Opposite "L121", change description to read "CHOKE, RF: 1.5 uh ± 10%, CIR type CLA". Under "L121" add 'L122, Same as L121".
7-6	Orig.	Table 7-1	Opposite "R108" in "Name and Description" column, delete "220K", insert "150K"; delete "RC20GF224K", insert "RC20GF154K".
7-11	Orig.	Table 7-2	Opposite "C114" insert "N5910-668-9335" in "Federal" column. Opposite "C122" insert "N6625-504-1029" in 'Federal" column. Under "C127" insert "C128" and insert 'N5910-284-4050" in "Federal" column. Opposite 'C129" insert "N5910-543-0086" in "Federal" column.
7-12	Orig.	Table 7-2	Opposite "L121" delete stock numbers. Opposite "R108" delete stock numbers.
7-13	Orig.	Table 7-2	Under "R133" insert: REF DESIG — FEDERAL R134 — N5905-299-2046 R135 — *N5905-249-4210 R136 — N5905-252-5434
7-14	Orig.	Table 7-2	Opposite "Z101" insert "N5915-538-1927" in "Federal" column. Opposite "Z501" delete "N5915-547-1541", insert "N5915-520-8468" in "Federal" column, insert "N5915-547-1541" in "Signal Corps" column.
7-15,7-16	Orig.	Table 7-3	Delete the following Federal Stock Numbers and reference designations: 5905-644-9502 — R108 N5905-192-0667 — R108 N5999-501-7400 — L121 Insert the following Federal Stock Numbers and reference designations in numerical sequence: N5905-249-4210 — R135 N5905-252-5434 — R136 N5905-299-2046 — R134 N5910-284-4050 — C128 N5910-543-0086 — C129 N5910-668-9335 — C114 N5915-520-8468 — Z501 N5915-538-1927 — Z101 N6625-504-1029 — C122

Insert this temporary correction in the technical manual immediately after the front cover and preceding T-1.

Correction T-2

TEMPORARY CORRECTION T-1 TO TECHNICAL MANUAL FOR
RF SIGNAL GENERATOR SET AN/URM-26B
NAVSHIPS 92890

This temporary correction is in effect upon receipt.

This temporary correction changes the technical manual to reflect production changes and to correct typographical errors.

Make the following pen and ink corrections:

PAGE NO	CHANGE IN EFFECT	PARA & LINE or FIG & LOCATION	ACTION
4-7	Orig.	4-8 Top, Left	Delete capacitor C109.
		4-4b Line 7	Delete "C109 and".
5-6	Orig.	5-3 Top, Right	Delete capacitor C109
6-8	Orig.	6-8 Bottom, Left	Delete capacitor C109
7-2	Orig.	Table 7-1	Opposite C109, delete "6" from "Notes" column. Delete description, insert "Ref. desig. cancelled". Delete locating function.
7-11	Orig.	Table 7-2	Delete "C109" and stock numbers. Under "Federal" column, opposite "C114", insert "N5910-668-9335" and opposite "C122", insert "N6625-504-1029". Following "C127", insert "C128", Federal Stock Number "5910-284-4050". Opposite "E111", insert "5955-564-2034" in "Federal" column.
7-12	Orig.	Table 7-2	Opposite "R109" and "R110", delete Federal stock numbers.
7-13	Orig.	Table 7-2	Opposite "R119", insert "5905-642-3471" in "Signal Corps" column. Opposite "R121", insert "N5905-279-3502" in "Federal" column. Opposite "R124", delete stock numbers from "Federal" and "Signal Corps" columns, insert "N5905-185-8510" in "Federal" column. Following "R124", insert "R127", Federal stock number "N5905-195-6453".

PAGE NO	CHANGE IN EFFECT	PARA & LINE or FIG & LOCATION	ACTION
			Following "R133", insert "R134", Federal number "N5905-299-2046". Following "R134", insert "R136", Federal number "N5905-252-5434". Opposite "R501", in Signal Corps column, insert "5905-279-3517". Opposite "W101A", in Signal Corps column, insert "6145-548-1266".
7-14	Orig.	Table 7-2	Opposite "Z101", in Federal column, insert "N5915-538-1927".
7-15,7-16	Orig.	Table 7-3	Delete the following stock numbers and reference designations: 5910-100-8125 C109 N5905-171-2004 R124 N5910-114-2430 C109 3330-376050000 C109 Insert the following stock numbers and reference designations in numerical sequence: 5905-279-3517 R501 5905-642-3471 R119 5910-284-4050 C128 5955-564-2034 E111 6145-548-1266 W101A N5905-185-8510 R124 N5905-195-6453 R127 N5905-252-5434 R136 N5905-279-3502 R121 N5905-299-2046 R134 N5910-668-9335 C114 N5915-538-1927 Z101 N6625-504-1029 C122

Insert this temporary correction in the technical manual immediately after the front cover.

NAVSHIPS 92890

TECHNICAL MANUAL

for

R.F. SIGNAL GENERATOR SET AN/URM-26B

TRAD ELECTRONICS CORPORATION
ASBURY PARK, NEW JERSEY

DEPARTMENT OF THE NAVY

BUREAU OF SHIPS

Contract: NObsr-57537
NObsr-59607
NObsr-71785

Approved by BuShips:
23 October 1956

LIST OF EFFECTIVE PAGES

PAGE NUMBERS	CHANGE IN EFFECT	PAGE NUMBERS	CHANGE IN EFFECT
Title Page	Original	4-0 to 4-9	Original
ii to viii	Original	5-0 to 5-17	Original
1-0 to 1-3	Original	6-0 to 6-16	Original
2-0 to 2-1	Original	7-1 to 7-17	Original
3-0 to 3-13	Original	i-0 to i-2	Original

DEPARTMENT OF THE NAVY
BUREAU OF SHIPS
WASHINGTON 25, D. C.

IN REPLY REFER TO
Code 993-100
23 October 1956

From: Chief, Bureau of Ships
To: All Activities concerned with the Installation, Operation, and Maintenance of the Subject Equipment

Subj: Technical Manual for RF Signal Generator Set AN/URM-26B NAVSHIPS 92890

1. This is the technical manual for the subject equipment and is in effect upon receipt.

2. When superseded by a later edition, this publication shall be destroyed.

3. Extracts from this publication may be made to facilitate the preparation of other Department of Defense publications.

4. Errors found in this manual (other than obvious typographical errors), which have not been corrected by means of Temporary Corrections or Permanent Changes, should be reported. Such report should include the complete title of the publication and the publication number (short title); identify the page and line or figure and location of the error; describe the error or indicate what change should be made; and be forwarded to the Electronics Publications Section of the Bureau of Ships.

5. All Navy requests for NAVSHIPS electronics publications should be directed to the nearest Bureau of Supplies and Accounts Forms and Publications Supply Point. When changes or revised books are distributed, notice will be included in the Electronics Information Bulletin, NAVSHIPS 900,022, and in the Index of Bureau of Ships General and Electronics Publications, NAVSHIPS 250-020.

A. G. MUMMA
Chief of Bureau

RECORD OF CORRECTIONS MADE

CHANGE NO.	DATE	FIELD CHANGE NO.	SIGNATURE

TABLE OF CONTENTS

SECTION 1 – GENERAL INFORMATION

Paragraph *Page*

1-1. Scope 1-1
1-2. Purpose and Basic Principles 1-1
1-3. Detailed Description 1-1
1-4. Reference Data 1-2
1-5. Equipment Similarities 1-2
1-6. Electron Tube, Crystal Diode, Fuse and Indicator Lamp Complement 1-2

SECTION 2 – INSTALLATION

2-1. Unpacking 2-0
2-2. Installation 2-1
2-3. Adjustments 2-1

SECTION 3 – OPERATOR'S SECTION

3-1. General 3-0
3-2. Power Circuit 3-0
3-3. Checking the Meter Zero 3-0
3-4. Setting the Carrier Frequency 3-0
3-5. Adjusting RF Output Voltage 3-1
3-6. Internal Sine Wave Modulation 3-1
a. Precautions 3-1
b. Procedure 3-1
3-7. External Sine Wave Modulation 3-6
3-8. External Pluse Modulation 3-6
3-9. Coupling to Equipment Under Test 3-6
a. General 3-6
b. Equipment With Input Impedance of 50 Ohms 3-6
c. Equipment With Input Impedance Less Than 50 Ohms 3-6
d. Equipment With Input Impedance Somewhat Greater Than 50 Ohms 3-6
e. Receiver Input Impedance Considerably Greater Than 50 Ohms 3-7
3-10. Use of Impedance Matching Network CU-439/URM-26B 3-7
3-11. Use of Fixed Attenuator CN-316/URM-26B (20 db pad) 3-8
a. Receiver Impedance at 50 Ohms 3-8
b. Receiver Impedance Less Than 50 Ohms 3-8
c. Receiver Impedance Somewhat Greater Than 50 Ohms 3-8
d. Receiver Impedance Considerably Greater Than 50 Ohms 3-8
e. Special Case Where Receiver Impedance is Greater Than 50 Ohms But Much Less Than 300 Ohms 3-9
f. Decade Checking 3-9
3-12. Use of Fixed Attenuator CN-315/URM-26B (6db pad) 3-9
a. Receiver Impedance at 50 Ohms 3-9

SECTION 3 – OPERATOR'S SECTION (Cont.)

Paragraph *Page*

b. Receiver Impedance Less Than 50 Ohms 3-9
c. Receiver Impedance More Than 500 Ohms 3-11
d. Receiver Impedance Between 50 Ohms and 500 Ohms 3-11
3-13. Summary of Operation 3-11
a. General 3-11
b. Steps in Operation 3-11
3-14. General Instructions for Use and Supplementary Data 3-12
a. General 3-12
b. Receiver Tests 3-12
c. Standard Levels 3-13
d. Voltmeter Used as an Output Meter . . . 3-13

SECTION 4 – PRINCIPLES OF OPERATION

4-1. General Description of Circuits 4-1
4-2. CW Operation 4-1
a. General 4-1
b. Carrier Oscillator 4-1
c. Frequency Modulation Compensator . . . 4-2
d. Carrier Level Measuring Circuit 4-3
e. Variable RF Output Attenuator 4-3
4-3. Pulse Modulation Circuit 4-3
a. Pulse Transformer 4-3
b. Pulse Limiter 4-5
4-4. Internal Modulation Circuit 4-5
a. Audio Oscillator 4-5
b. Modulator 4-7
c. % Modulation Circuit 4-7
4-5. External Modulation Circuit 4-7
4-6. Terminating the Signal Generator 4-8
4-7. Power Supply PP-1215/URM-26B 4-8

SECTION 5 – TROUBLE-SHOOTING

5-1. General 5-0
5-2. Periodic Testing 5-0
a. Routine Maintenance Check Chart 5-0
b. Fuse Failure 5-0
c. Lubrication 5-0
5-3. Performance Standards 5-0
5-4. Test Equipment Required For Making Repairs and Troubleshooting 5-2
5-5. Functional Section Trouble-shooting and Repair 5-2
a. Power Supply PP-1215/URM-26B 5-2
b. Audio Oscillator 5-2
c. Modulator 5-2
d. Pulse Modulator 5-3
e. RF Oscillator 5-3
5-6. Tube Socket Electrical Measurements. . . . 5-15
5-7. Typical Troubles 5-15

SECTION 6 – REPAIR

Paragraph *Page*

6-1. Failure Report 6-0
6-2. Tuning and Adjustment 6-0
6-3. Removing the Signal Generator and Power Supply from the Case 6-0
a. Removing RF Signal Generator SG-117/URM-26B 6-0
b. Removing Power Supply PP-1215/URM-26B 6-0
6-4. Removal and Replacement of Parts 6-3
6-5. Removing and Replacing RF Oscillator Components 6-3
a. Removing RF Oscillator Cover Plate . . 6-3
b. Removing RF Oscillator Tube V103 . . . 6-3
c. Removing Coil Turret 6-3
d. Removing Tuning Capacitor 6-3
e. Removing a Coil From the Turret 6-3
f. Removing Metering Crystal Pickup Mount 6-3

SECTION 6 – REPAIR (Continued)

Paragraph *Page*

6-6. Removing RF Attenuator 6-4
6-7. Disassembly of RF Attenuator 6-4
6-8. Removing Low-pass Filter Subassembly . . 6-6
6-9. Removing Audio Compartment 6-6
6-10. Recalibrating RF Oscillator 6-6
6-11. Recalibrating Microvolts Output 6-9
6-12. Recalibrating Percentage Modulation 6-10

SECTION 7 – PARTS LIST

7-1. Introduction 7-1
7-2. Maintenance Parts List 7-1
7-3. Stock Number Identification and List of Parts Supplied 7-1
7-4. Stock Number Cross Reference 7-1
7-5. List of Manufacturers 7-1
7-6. Notes 7-1

LIST OF ILLUSTRATIONS

SECTION 1 – GENERAL INFORMATION

Figure *Page*

1-1. RF Signal Generator Set AN/URM-26B, Complete Equipment 1-0

SECTION 2 – INSTALLATION

2-1. RF Signal Generator Set AN/URM-26B, Unpacking Procedure 2-0
2-2. RF Signal Generator Set AN/URM-26B, Outline Dimensions 2-1

SECTION 3 – OPERATOR'S SECTION

3-1. Diagram Showing Vernier Reading of Frequency Tuning 3-2
3-2. Diagram Showing Vernier Reading of Logging Reset 3-3
3-3. Chart of Input-Output Pulse Duration Relationship 3-4
3-4. Chart of RF Pulse Voltage Determination 3-5
3-5. Equivalent Circuit of RF OUTPUT with Series Matching Resistor Added 3-7
3-6. Equivalent Circuit of RF OUTPUT with Shunt Resistor Added 3-7
3-7. Schematic Diagram of Impedance Matching Network CU-439/URM-26B 3-8
3-8. Equivalent Circuit of Output of Signal Generator with (10:1) Fixed Attenuator CN-316/URM-26B 3-8
3-9. Method of Inserting Attenuators and Matching Network Between Signal Generator and Receiver 3-9
3-10. Simplified Procedure for Operating RF Signal Generator Set AN/URM-26B 3-11

SECTION 3 – OPERATOR'S SECTION (Cont.)

Figure *Page*

SECTION 4 – PRINCIPLES OF OPERATION

4-1. RF Signal Generator Set AN/URM-26B, Functional Block Diagram 4-0
4-2. Simplified Schematic Diagram of the RF Oscillator, set at Band C 4-2
4-3. Equivalent Circuit of RF Oscillator with Frequency Modulation Compensator 4-3
4-4. Simplified Schematic of the Waveguide-below-cutoff Attenuator and RF Level Monitoring 4-4
4-5. Simplified Schematic Diagram Showing Pulse Limiter and RF Oscillator Stages When Switched to PULSE Position 4-4
4-6. Oscilloscope Hookup to Observe Pulse Waveform 4-5
4-7. Simplified Schematic Diagram of the Audio Oscillator Set for 1000 Cycle Operation . . 4-6
4-8. Simplified Schematic Diagram of the Modulation Amplifier and % MODULATION meter circuit 4-7
4-9. Simplified Schematic Diagram Showing External Modulation 4-8
4-10. Schematic Diagram of Power Supply PP-1215/URM-26B 4-9

SECTION 5 – TROUBLE-SHOOTING

Figure *Page*

5-1. Power Supply PP-1215/URM-26B with Chassis Folded Flat and Line Filter Assembly 5-3
5-2. Test Points; Audio Oscillator, Modulator and Pulse Circuits with Chassis Folded Back 5-5
5-3. Wiring Diagram; Audio Oscillator, Modulator and Pulse Circuits with Chassis Folded Back 5-6
5-4. Audio and Metering Section Terminal Board, Outside View 5-9
5-5. Modulation and Pulse Transformers, and Filters 5-9
5-6. RF Oscillator Stage Showing Test Points and Wiring 5-11
5-7. Metering Crystal Pickup Mount 5-13
5-8. Oscilloscope Hookup to Observe RF Output 5-13
5-9. Signal Generator Voltage and Resistance Chart 5-14

SECTION 6 – REPAIR

Figure *Page*

6-1. Front Panel View for Removal of RF Signal Generator SG-117/URM-26B from Case 6-2
6-2. Rear View for Removal of Power Supply PP-1215/URM-26B from Case 6-3
6-3. Rear View of Signal Generator SG-117/URM-26B 6-4

SECTION 6 – REPAIR (Continued)

Figure *Page*

6-4. Oscillator Coil Turret Top and Bottom Views 6-5
6-5. RF. Oscillator and Variable Capacitor Subassembly 6-5
6-6. Waveguide-below-cut-off Attenuator Cut-away View, Showing Internal Construction 6-7
6-7. Audio and Metering Section Subassembly, General View 6-7
6-8. Bottom View of Audio and Metering Section Sub-Chassis 6-8
6-9. Recalibration Setup 6-9
6-10. Percentage Modulation Chart 6-10
6-11. Top View of Power Supply PP-1215/URM-26B 6-11
6-12. Bottom View of Power Supply PP-1215/URM-26B 6-12
6-13. Interior View of Impedance Matching Network CU-439/URM-26B 6-13 6-14
6-14. Interior View of (2:1) Fixed Attenuator CN-315/URM-26B 6-13 6-14
6-15. Interior View of (10:1) Fixed Attenuator CN-316/URM-26B 6-13 6-14
6-16. RF Signal Generator Set AN/URM-26B, Overall Schematic 6-15 6-16

LIST OF TABLES

SECTION 1 – GENERAL INFORMATION

Table *Page*

1-1. RF Signal Generator Set AN/URM-26B, Equipment Supplied 1-3
1-2. Electron Tube, Crystal Diode, Fuse and Indicator Lamp Complement 1-3

SECTION 3 – OPERATOR'S SECTION

3-1. Operational Summary of Front Panel Controls 3-1
3-2. Correct Methods for Terminating the Signal Generator at J101 3-10

SECTION 5 – TROUBLE-SHOOTING

5-1. Routine Check Chart 5-1
5-2. Symptoms of Fuse Failure 5-2
5-3. Fuse Locations 5-2

SECTION 5 – TROUBLE-SHOOTING (Cont.)

Table *Page*

5-4. Power Supply PP-1215/URM-26B, Functional Section Trouble-Shooting Chart 5-4
5-5. Audio Oscillator Section, Functional Section Trouble-Shooting Chart 5-7
5-6. Modulator Section, Functional Section Trouble-Shooting Chart 5-8
5-7. Pulse Modulator, Functional Section Trouble-Shooting Chart 5-10
5-8. RF Oscillator Section, Functional Section Trouble-Shooting Chart 5-12
5-9. Typical Troubles 5-15

SECTION 6 – REPAIR

6-1. Trouble Symptom Chart 6-1
6-2. Frequency Calibration Data 6-11

SECTION 7 – PARTS LIST

Table *Page*

7-1. RF Signal Generator Set AN/URM-26B, Maintenance Parts List . . . 7-2
7-2. RF Signal Generator Set AN/URM-26B, Stock Number Identification 7-11
7-3. RF Signal Generator Set AN/URM-26B, Stock Number Cross Reference 7-15
7-4. RF Signal Generator Set AN/URM-26B, List of Manufacturers 7-17

SECTION 1
GENERAL INFORMATION

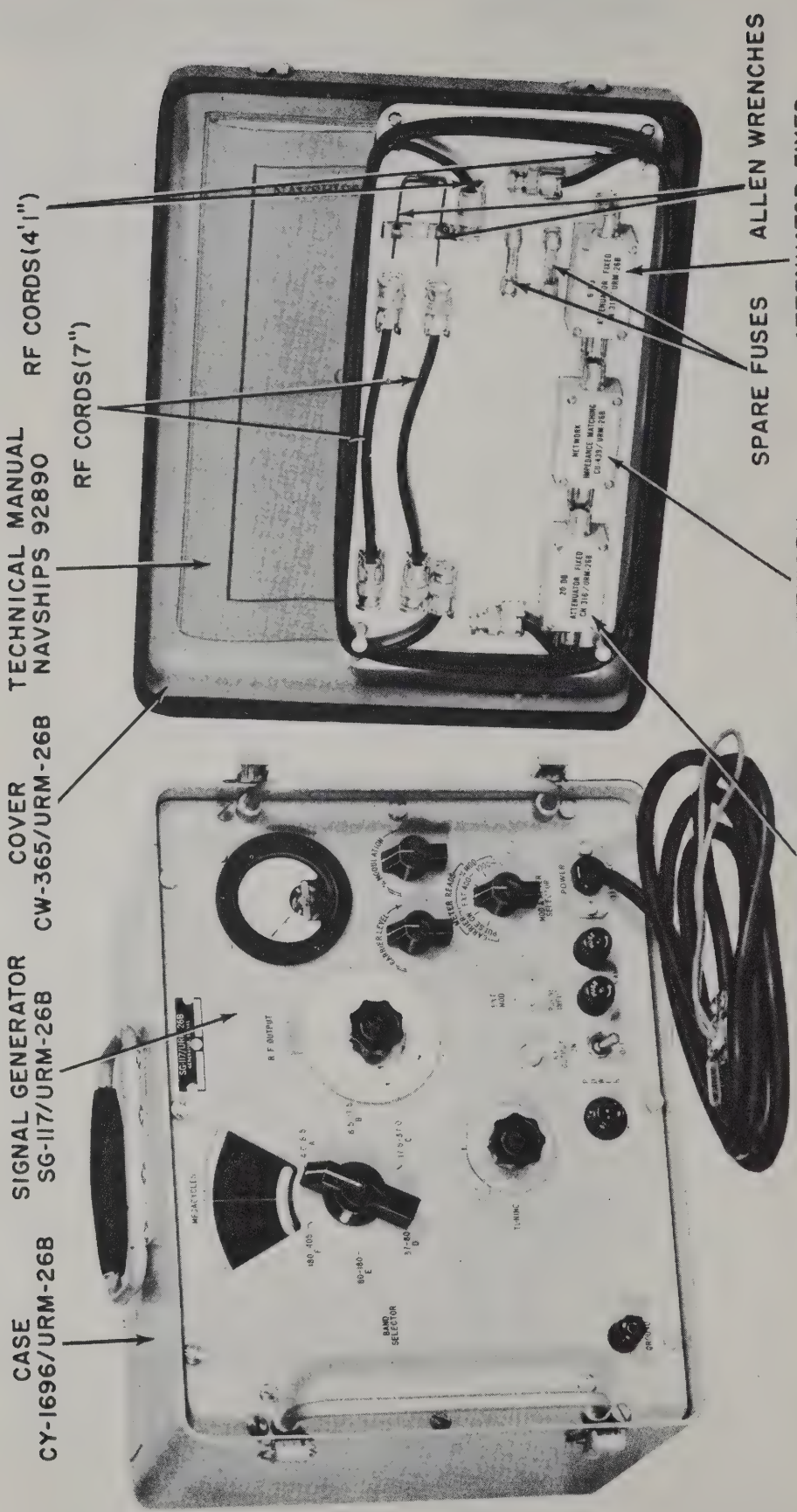


Figure 1-1. RF Signal Generator Set AN/URM-26B, Complete Equipment.

SECTION 1

GENERAL INFORMATION

1-1. SCOPE.

This instruction book contains descriptive material and instructions for operation and maintenance of RF Signal Generator Set AN/URM-26B as manufactured by Trad Electronics Corporation, on Contract NObsr-57537. Coverage includes complete information regarding operation, repair, calibration and adjustment of the equipment as well as a detailed explanation of its theory of operation. A complete list of replaceable parts is contained in Section 7.

1-2. PURPOSE AND BASIC PRINCIPLES.

a. RF Signal Generator Set AN/URM-26B is a portable test equipment intended for bench testing of electronic equipment. Its most general use is for alignment and determination of receiver sensitivity, selectivity and gain. Radio frequency (rf) signals generated by this set range from 4 megacycles (mc) to 405 mc continuous wave (cw) or amplitude modulated (am) internally at 400 or 1000 cycles-per-second (cps or cycles) sine wave. Facilities are provided for external modulation by sine waves or pulses.

b. The AN/URM-26B is self-contained in a combination case and cover. It operates from a source of 103 to 126 volts, 50 to 1000 cycles, single phase alternating current (ac).

c. The complete equipment consists of the following components:

(1) Signal Generator	SG-117/URM-26B
(2) Power Supply	PP-1215/URM-26B
(3) Signal Generator Case	CY-1696/URM-26B
(4) Signal Generator Cover	CW-365/URM-26B
(5) Impedance Matching Network	CU-439/URM-26B
(6) Fixed Attenuator	CN-315/URM-26B (6db)
(7) Fixed Attenuator	CN-316/URM-26B (20db)
(8) Cord, RF, 4'-1" long	(2 each)
(9) Cord, RF, 7" long	(2 each)

1-3. DETAILED DESCRIPTION.

a. Signal Generator SG-117/URM-26B and Power Supply PP-1215/URM-26B are contained within Case CY-1696/URM-26B. All controls, connectors, fuses and the meter of the signal generator are located on the front panel, and are clearly marked for identification by black engraved characters against the grey finish background. Two handles, one on each side of the front panel, serve to facilitate the removal of the signal generator from its case and to protect the panel fixtures from damage. The case has four spring hasps that permit the complete removal of the protective Cover CW-365/URM-26B. The cover includes a plate having spring clips in which the smaller components of the test set are mounted. The cords (rf cables), Allen wrenches and instruction book also are stored in the cover. (See figure 1-1.) Internally the signal generator consists of three major subassemblies:

(1) The radio frequency circuitry which is housed in a rugged cast aluminum shield, and includes the rf oscillator circuit, the waveguide below-cutoff (piston-type) attenuator, and the filter networks which prevent the appearance of rf current in the external circuit wiring.

(2) The audio modulating and metering circuits that are part of a subassembly mounted on the front panel.

(3) The power supply which is built into a subchassis assembly bolted in position in the case. Its input and output are connected to the signal generator by a detachable plug and a short length of cable.

b. The overall dimensions and weight of the equipment are listed in table 1-1.

c. Signal Generator SG-117/URM-26B consists basically of a variable frequency rf oscillator covering the frequency range from 4 to 405 mc in 6 bands. The modulation, metering and adjustment of its rf output are accomplished through the use of auxiliary circuits. A master control switch, marked MOD & METER SELECTOR, selects the various functions of the signal generator and switches the panel meter. The rf output frequency is varied with a calibrated direct-reading dial having a vernier scale. The rf output voltage level is standardized at a red line on the panel meter and varied by a waveguide-below-cutoff (piston-type) attenuator having a direct reading calibrated dial. A modulator stage applies sine wave modulation from an internal audio oscillator, or from an external source, to the rf oscillator, depending on the setting of the MOD & METER switch.The degree of audio modulation is indicated on the panel meter % MODULATION scale. Modulating signal at either 400 or 1000 cycles is available from the internal audio oscillator. Modulation signals with frequencies up to 20,000 cycles may be applied from the external source. When external pulse modulation is applied, the amplitude of the pulse must be at least 40 volts peak value, positive-going.

The pulse duration can be between 2 and 40 microseconds (μsec) at frequencies up to 100 mc and between 1 and 40 μsec from 100 mc to 405 mc.

d. Power Supply PP-1215/URM-26B furnishes 180 volts unregulated high voltage direct current (dc) for the operation of non-critical circuits of the signal generator, plus 210 volts regulated to the rf oscillator and other critical circuits, and 6.3 volts ac for the heaters of all electron tubes. The power supply uses a conventional power transformer, full-wave rectifier circuit, well filtered to minimize ripple content. The ac power input circuit to the power supply through 3-prong power plug P102 through front instrument panel has an rf filter network which prevents stray rf current from appearing in the power line.

e. Impedance Matching Network CU-439/URM-26B (see figure 6-13) is a coaxial 51 ohm resistive shunt used to terminate the rf output of the signal generator when working into relatively high impedance loads. It is designed to have a very low voltage standing wave ratio so that it can be inserted into the circuit with a minimum of disturbance. The UG-1094/U coaxial type BNC connectors on each end mate with BNC plugs of rf cords supplied.

f. Fixed Attenuator CN-315/URM-26B (see figure 6-14) is designed to provide 6db attenuation (2:1 voltage ratio) when terminated in 50 ohms impedance. Each end has a type UG-1094/U BNC coaxial connector to facilitate the connection of rf cords supplied.

g. Fixed Attenuator CN-316/URM-26B (see figure 6-15) is designed to provide 20db attenuation (10:1 voltage ratio) when terminated in 50 ohms impedance. Each end has a type UG-1094/U BNC coaxial connector to facilitate connection of rf cords supplied. The input impedance to the fixed attenuators and impedance adapter is 50 ohms.

h. The coaxial rf cords supplied (see figure 1-1) are used in making connections between the signal generator output and the equipment being tested, and to facilitate the insertion of the impedance adapter and fixed attenuators. Two cords, four feet long and two cords seven inches long are supplied. These cords are terminated at each end in type UG-88/U coaxial connectors.

1-4. REFERENCE DATA.

a. NOMENCLATURE. – RF Signal Generator Set AN/URM-26B.

b. CONTRACT. – NObsr-57537 dated 23 June 1952

c. CONTRACTOR. – Trad Electronics Corp., Asbury Park, N. J.

d. COGNIZANT NAVAL INSPECTOR. – Inspector of Navy Materials; Newark, New Jersey.

e. NUMBER OF PACKAGES PER SHIPMENT.–One

f. TOTAL CUBICAL CONTENTS. – See table 1-1.

g. TOTAL WEIGHT. – See table 1-1.

h. FREQUENCY RANGE. – 4 mc to 405 mc. Calibration accuracy ± 0.5%.

i. TUNING BANDS AND RANGES.

(1) 4.0 to 8.5 mc	BAND A
(2) 8.5 to 17.5 mc	BAND B
(3) 17.5 to 37.0 mc	BAND C
(4) 37 to 80 mc	BAND D
(5) 80 to 180 mc	BAND E
(6) 180 to 405 mc	BAND F

j. TYPES OF MODULATION.

(1) Sine wave AM; 0to 50%.

(a) Internal modulation, 400 or 1000 cps, ±5%.

(b) External modulation, 100 to 20,000 cps.

(c) Input impedance, approximately 5000 ohms at 1000 cps.

(2) External pulse modulation.

(a) Minimum pulse amplitude – 40 volts, positive-going.

(b) Pulse repetition rate – 50 to 5000 pulses per second.

(c) Pulse duration – 2 to 40 μsec up to 100 mc; 1 to 40 μsec from 100 mc to 405 mc.

(d) Input impedance, nominally 70 ohms at pulse frequencies specified.

k. RF OUTPUT VOLTAGES. – From 0.1 to 100,000 microvolts (μv) ± 10% up to 100 mc; ± 20% up to 405 mc, terminated in 50 ohms.

l. POWER SUPPLY PP-1215/URM-26B REQUIREMENTS.

(1) SOURCE VOLTAGE: 115 volts ac ± 10%.

(2) FREQUENCY : 50 to 1000 cps.

(3) PHASE: Single.

m. POWER CONSUMPTION: 38 watts (approx.).

1-5. EQUIPMENT SIMILARITIES.

The overall function of RF Signal Generator Set AN/URM-26B is similar to that of preceding models. It incorporates, however, completely different mechanical and electrical designs. The details of these differences are so numerous that nothing can be gained through comparison with previous models.

1-6. ELECTRON TUBE, CRYSTAL DIODE, FUSE AND INDICATOR LAMP COMPLEMENT.

The applications and types of electron tubes, crystal diodes, fuses, and indicator lamps, together with their locations are listed in table 1-2.

TABLE 1-1. RF SIGNAL GENERATOR SET AN/URM-26B, EQUIPMENT SUPPLIED

QUANT. PER EQUIP.	NOMENCLATURE		* OVERALL DIMENSIONS			*VOLUME	*WEIGHT
	NAME	DESIGNATION	HEIGHT	WIDTH	DEPTH		
1	RF Signal Generator Set	AN/URM-26B	11-¼	14	10-½	1627	31
1	Case	CY-1696/URM-26B					
1	Signal Generator	SG-117/URM-26B					
1	Power Supply	PP-1215/URM-26B					
1	Signal Generator Cover	CW-365/URM-26B					
2	Cord, RF, 4'-1"						
2	Cord, RF, 7"						
1	Impedance Matching Network	CU-439/URM-26B					
1	Fixed Attenuator	CN-315/URM-26B					
1	Fixed Attenuator	CN-316/URM-26B					
2	Instruction Book						
2	Fuse						
1	Allen Wrench No.6						
1	Allen Wrench No.8						
	Spares						

*Unless otherwise stated, dimensions are in inches, volume in cubic feet, weight in pounds.

TABLE 1-2. ELECTRON TUBE, CRYSTAL DIODE, FUSE AND INDICATOR LAMP COMPLEMENT

APPLICATION	TYPE DESIGNATION	REFERENCE SYMBOL	LOCATION
ELECTRON TUBES			
Audio Oscillator	5814A	V101	Audio Subassembly
Modulator	6005/6AQ5W	V102	Audio Subassembly
RF Oscillator	5675	V103	Oscillator Compartment
Pulse Limiter	5726/6AL5W	V104	Audio Subassembly
B+ Full-Wave Rectifier	6X4WA	V201	Power Supply PP-1215/URM-26B
Voltage Regulators	OB2WA	V202, V203	Power Supply PP-1215/URM-26B
CRYSTAL DIODES			
% Modulation Voltmeter	1N69	CR101	Audio Attenuator Subassembly
Anti-fm diode	CK710	CR102	Oscillator Compartment
RF Level Voltmeter	1N82A	CR103	Output Attenuator Subassembly
FUSES			
Power Line Fuses	MDL-½ FO2GR500B	F101, F102	Front Panel
PILOT LAMPS			
Power Pilot Lamp	NE-51	I101	Front Panel

SECTION 2

INSTALLATION

2-1. UNPACKING.

a. The Signal Generator Set AN/URM-26B is packed, together with a set of equipment spares, in a V3C board box. The electron tubes are shipped in place. The signal generator, with accessories, and the set of spares are enclosed in separate specially cushioned cardboard cartons. Use extreme care in removing these items (see figure 2-1).

b. The accessories stored in the signal generator carton are located as follows (see figure 1-1).

(1) Impedance Matching Network CU-439/URM-26B, Fixed Attenuator CN-315/URM-26B, Fixed Attenuator CN-316/URM-26B, spare fuses and instruction book are located on the inside of the panel Cover CW-365/URM-26B. The aluminum plate inside the cover contains ferrule clips designed to mount these accessories.

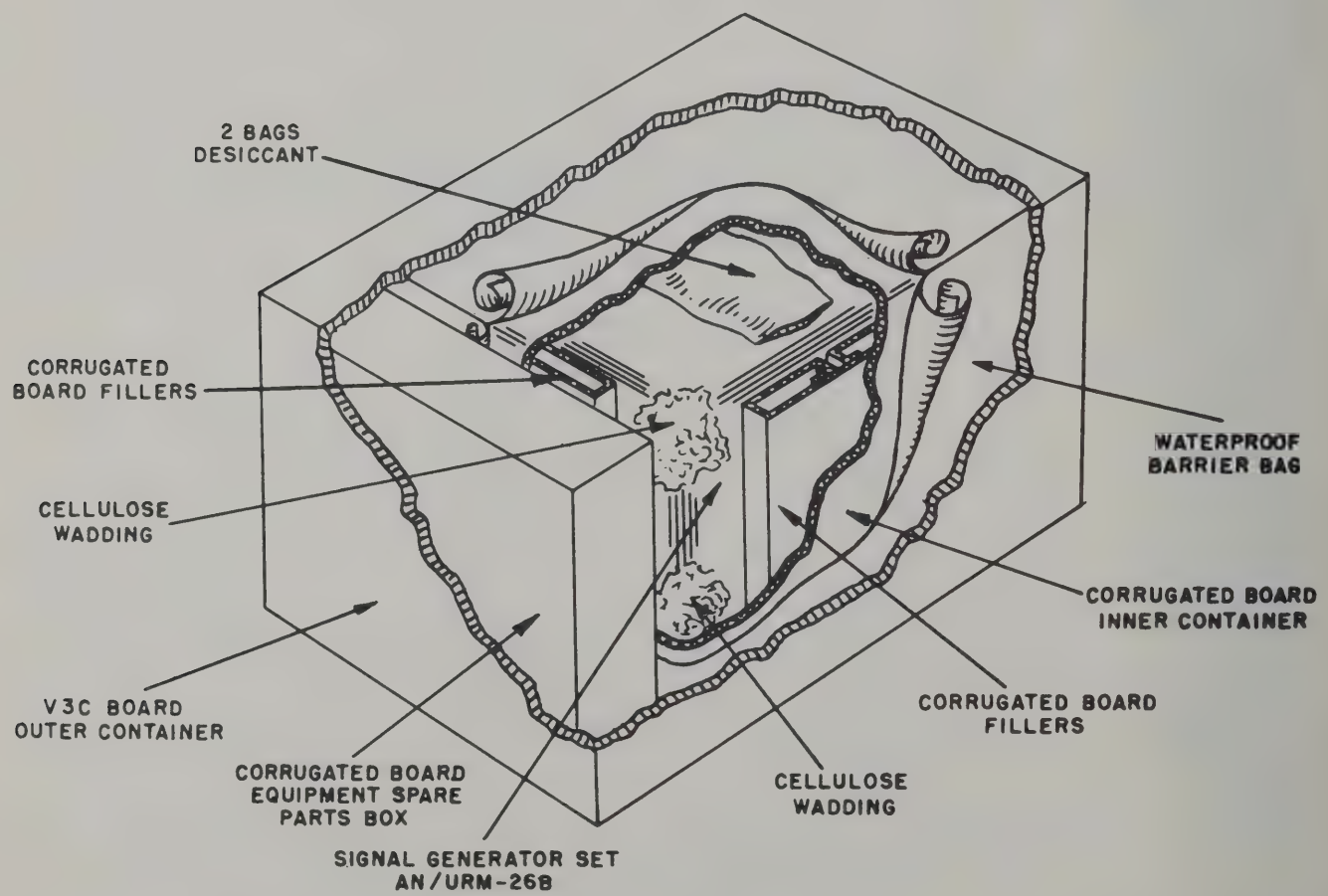


Figure 2-1. RF Signal Generator Set AN/URM-26B, Packaging Diagram.

(2) The RF Cords also mount on the aluminum plate.

c. Overall dimensions of Signal Generator Set AN/URM-26B are shown in Figure 2-2.

2-2. INSTALLATION.

a. Signal Generator Set AN/URM-26B is a portable signal generator and does not, therefore, require permanent installation.

b. The equipment is intended to be operated with the front panel in the vertical position. The case is mounted on rubber supporting feet which protect the polished surface and prevent the signal generator from slipping.

c. The following preliminary settings are required before placing the equipment in operation (see figure 6-1).

(1) Turn the POWER switch to OFF position.

(2) Turn the CARRIER LEVEL control completely counterclockwise.

(3) Turn % MODULATION control completely counterclockwise.

(4) Insert power plug P102 into suitable source of 115 volts ac power.

(5) Turn POWER switch ON. Permit a 15 minute warmup.

2-3. ADJUSTMENTS.

All operating adjustments are described in Section 3, OPERATOR'S SECTION.

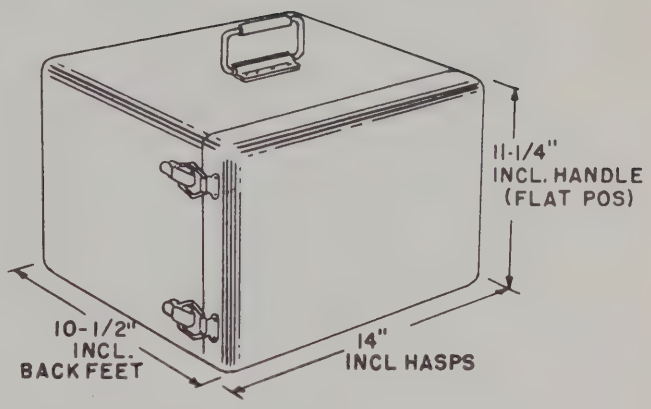


Figure 2-2. Signal Generator Set AN/URM-26B, Outline Dimensions.

SECTION 3

OPERATOR'S SECTION

3-1. GENERAL.

a. It is the purpose of the OPERATOR'S SECTION to instruct personnel in the use of RF Signal Generator Set AN/URM-26B as a test instrument. To become thoroughly familiar with the method of operation it is suggested that both Section 4, PRINCIPLES OF OPERATION, and this section be studied carefully.

b. In the development of this section, an attempt has been made to present each step in the logical sequence necessary to place the equipment in operation. If these steps are carefully followed, the operator will avoid damaging the signal generator and will be assured of a correct interpretation of the data indicated by the instrument. Table 3-1 is an operational summary of all front panel controls and connectors.

c. The essential details of operation and the necessary precautions to be taken are covered in this section under the following paragraph headings:

(1) Power Circuit.....Par. 3-2
(2) Checking the Meter Zero.....Par. 3-3
(3) Setting the Carrier Frequency.....Par. 3-4
(4) Adjusting RF Output Voltage.....Par. 3-5
(5) Internal Sine Wave Modulation...Par. 3-6
(6) External Sine Wave Modulation...Par. 3-7
(7) External Pulse Modulation.....Par. 3-8
(8) Coupling to Equipment Under Test.....Par. 3-9
(9) Use of Impedance Matching Network CU-439/URM-26B Par. 3-10
(10) Use of Fixed Attenuator CN-316 /URM-26B (20 db pad).....Par. 3-11
(11) Use of Fixed Attenuator CN-315 /URM-26B (6 db pad).....Par. 3-12
(12) Summary of Operation.....Par. 3-13
(13) General Instructions for Use and Supplementary Data.. .....Par. 3-14

3-2. POWER CIRCUIT.

a. Before applying power to the signal generator, turn the CARRIER LEVEL and % MODULATION controls completely counterclockwise.

b. Insert the power plug P102 into the 115V ac power source.

c. Turn the POWER switch to the ON position. Line voltage is now applied to the filament and high voltage power supply circuits. The POWER pilot lamp will glow.

d. To permit the instrument to reach a stable operating condition, allow a 15 minute warm-up period before making any further control settings.

3-3. CHECKING THE METER ZERO.

No electrical zeroing of the panel meter is required.

3-4. SETTING THE CARRIER FREQUENCY.

(See figure 6-1)

a. Turn the MOD & METER SELECTOR switch to CW position.

b. Rotate the BAND SELECTOR switch to the required frequency range.

c. Turn the TUNING dial, which is geared to the MEGACYCLES dial, until the desired frequency appears under the double hairline on the MEGACYCLES dial scale. To avoid parallax error, view the MEGACYCLES scale from the perpendicular angle so that the two hairlines appear as one.

d. The tuning dial has a vernier type 0-100 scale used in conjunction with a 0-1000 unmasked logging scale on the main dial for logging frequency, for frequency interpolation when calibrating the signal generator against a crystal controlled standard and for direct reading of the exact frequency.

e. For reading the exact frequency, it is necessary to read both the MEGACYCLES dial and the vernier TUNING dial, interpolating the fractional megacycles as follows: (see figure 3-1.). At "A" the dial reads '6.5 megacycles'. Note the vernier arrow points at '10'. At "B" the dial reads '6.6 megacycles'. Note the vernier arrow points to '30'. As shown in the figure, the difference in frequency is .1 mc, while the difference in tuning dial units is 20 graduations. Thus; 1 graduation is 1/20 of .1mc, or .005 mc or 5 kilocycles (kc). If it is desired to set the dial at exactly 6.51 mc, the vernier should be set at '12'.

f. For purposes of *logging* a specific frequency, the unmasked logging scale at the top of the MEGACYCLES window is used. See figure 3-2. This reads in even *hundreds* of arbitrary logging units. To record the exact dial setting in the log for future re-setting, record first the whole hundreds as shown at "A", then

TABLE 3-1. OPERATIONAL SUMMARY OF FRONT PANEL CONTROLS (See figure 6-1)

REFERENCE SYMBOL	PANEL DESIGNATION	FUNCTION
S102	BAND SELECTOR switch	Selects desired frequency band.
	MEGACYCLES dial	Indicates Output frequency
C122	TUNING dial	Selects desired frequency.
M101	Meter	Indicates rf level (upper scale), and percentage of carrier modulation (lower scale).
AT101	RF OUTPUT attenuator	50 ohm waveguide-below-cutoff (piston type) variable attenuator; adjusts rf output.
R119	CARRIER LEVEL control	In CARRIER division of MOD and METER SELECTOR switch, sets carrier amplitude to standard level indicated by red line on meter M101.
R113	% MODULATION control	Adjust degree of carrier modulation indicated on meter M101 when MOD and METER SELECTOR switch is under % MOD sector.
S101	MOD and METER SELECTOR switch	Selects the source of modulating voltage and modulating circuits of the signal generator, and also switches the function of meter M101.
J101	RF OUTPUT jack	RF output.
J103	EXT MOD PULSE INPUT jack	Input terminal for external modulation. Switched in function by MOD & METER SELECTOR switch.
GROUND	GROUND terminal	GROUND connecting point.
S103	POWER switch	Controls primary power 115V ac.
I101	Pilot lamp	Neon power "on" indicator.

read the units at the arrow on the tuning dial as shown at "B", finally recording the decimal where a marker on the tuning dial aligns with a marker on the decimal vernier scale, using the marker point after the arrow on the vernier scale as the decimal value as shown at "C".

3-5. ADJUSTING RF OUTPUT VOLTAGE

(See figure 6-1.)

a. Check that the MOD & METER SELECTOR switch is set to CW position.

b. Advance the CARRIER LEVEL control until the pointer of the panel meter indicates at the red line at the CARRIER LEVEL point. This is the output reference level for all frequencies.

c. Rotate the RF OUTPUT attenuator control until the desired output voltage on the MICROVOLTS scale coincides with the hairline indicator. The voltage indicated is the output at J101, RF OUTPUT jack, when the signal generator is properly terminated in 50 ohms. Termination principles are more fully discussed in paragraph 3-9. The RF OUTPUT attenuator dial also has a corresponding scale calibrated in (-) dbm (decibels below one milliwatt).

d. Do not adjust RF OUTPUT voltage after modulation has been applied.

e. Repeat the above procedure whenever the carrier frequency is changed or whenever the signal generator has been on frequency for long periods of time.

f. If changes in frequency or other controls cause pointer of the panel meter to leave the red line setting, readjust CARRIER LEVEL control so that pointer is again at the red line.

3-6. INTERNAL SINE WAVE MODULATION.

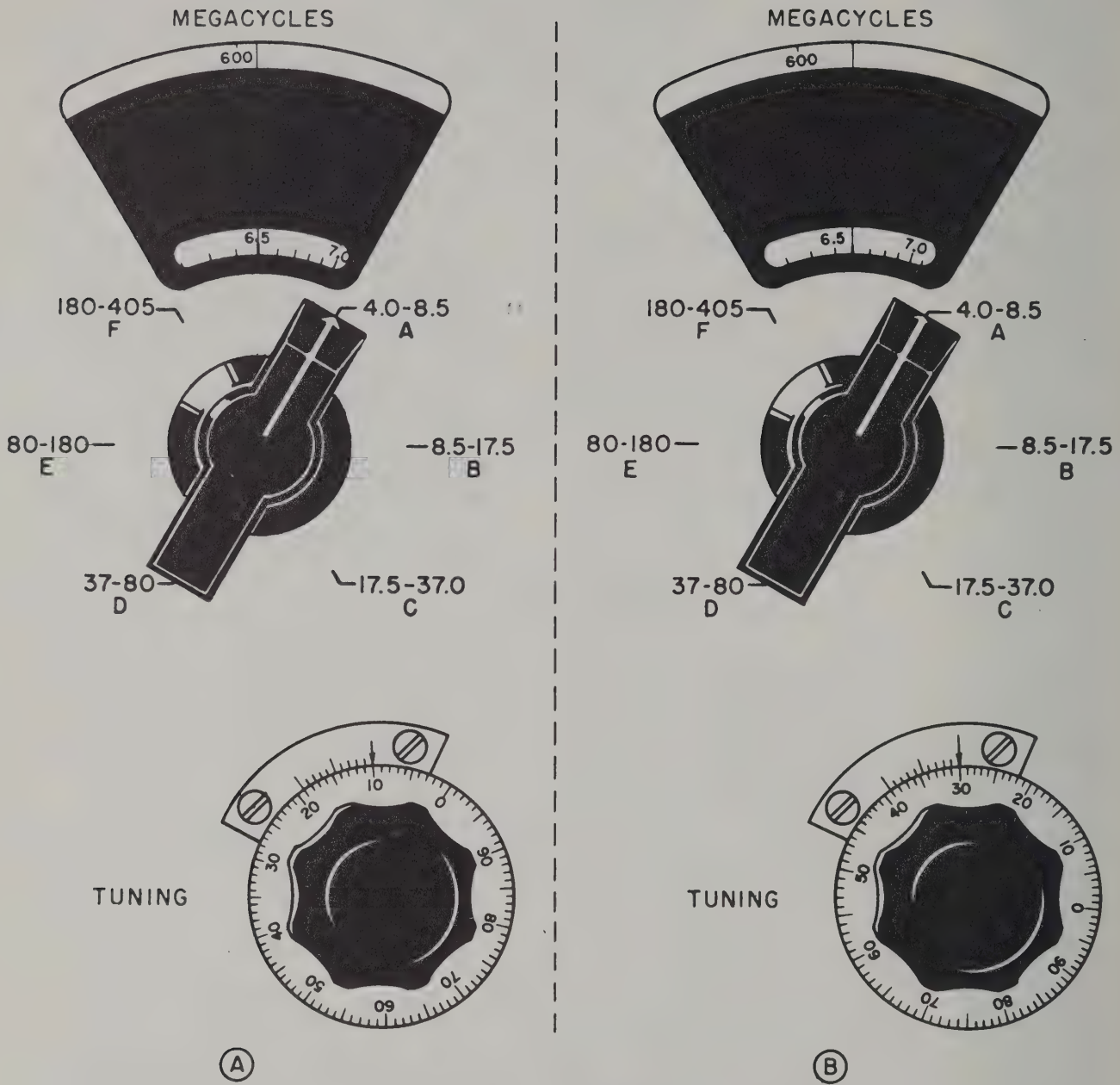
(See figure 6-1.)

a. PRECAUTIONS. – Before applying modulation, set the output voltage according to paragraph 3-5 above. If it is necessary to readjust output voltage after modulation has been applied, return the MOD & METER SELECTOR switch to CW position.

b. PROCEDURE.

(1) Set the MOD & METER SELECTOR switch to either 400 or 1000 ~ position in the % MOD sector as required. In both these positions the internal modulation circuits are activated, and the panel meter is switched to indicate the degree of carrier modulation directly on the % MODULATION scale.

(2) Rotate the % MODULATION control until the required modulation percentage is indicated on the panel meter.



FREQUENCY DIAL		TUNING DIAL
6.6MC	=	30
6.5MC	=	10
0.1 MC	=	20 GRADUATIONS

THEREFORE: BETWEEN 6.5 AND 6.6MC,
EACH TUNING DIAL GRADUATION = $\frac{0.1\text{MC}}{20}$ = 0.005MC = 5KC
READ AT ARROW ONLY.
ADD 5KC FOR EACH GRADUATION ABOVE 10 (IN THIS CASE).

Figure 3-1. Diagram Showing Vernier Reading of Frequency Tuning.

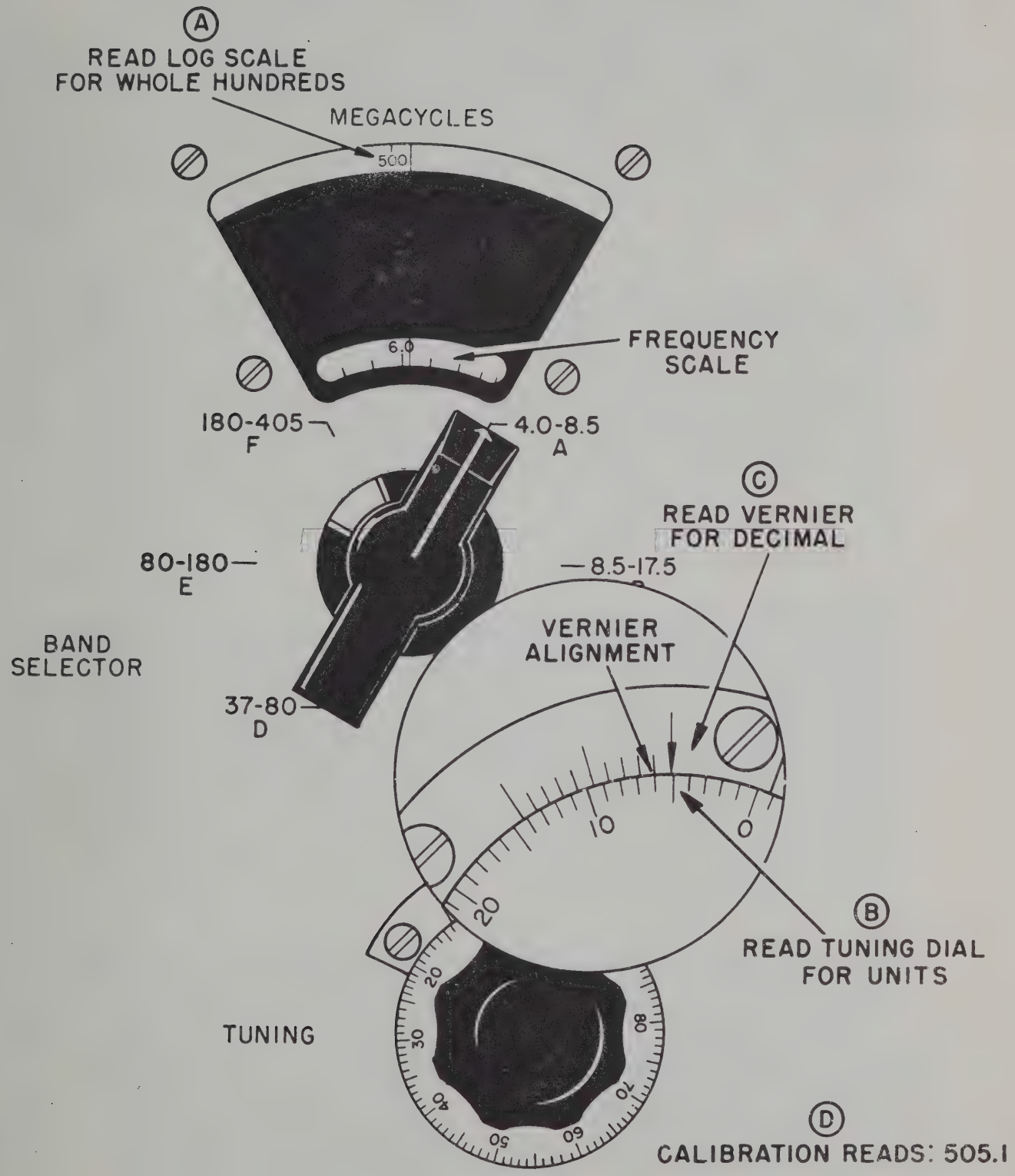


Figure 3-2. Diagram Showing Vernier Reading of Logging Reset.

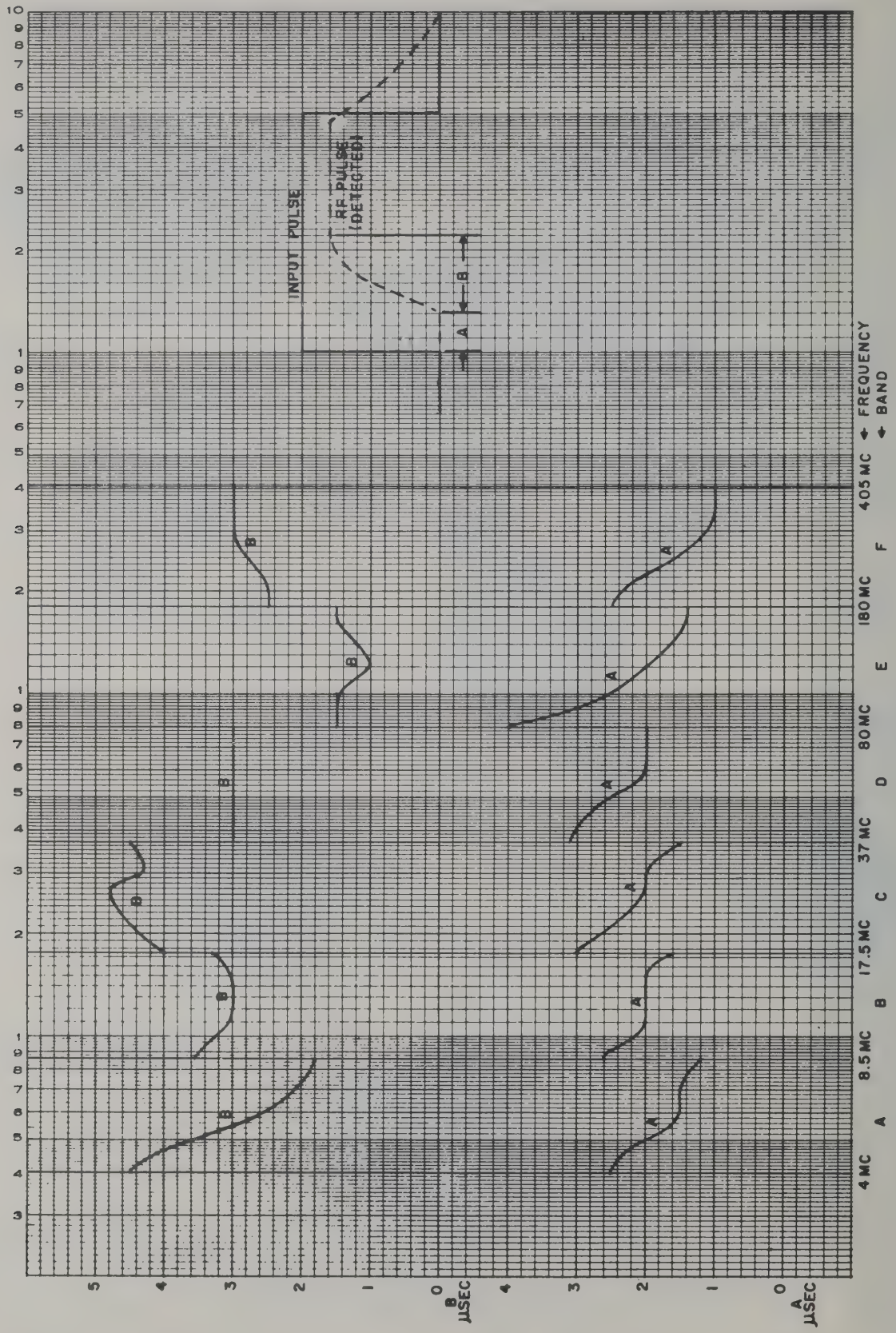


Figure 3-3. Chart of Input-Output Pulse Duration Relationship.

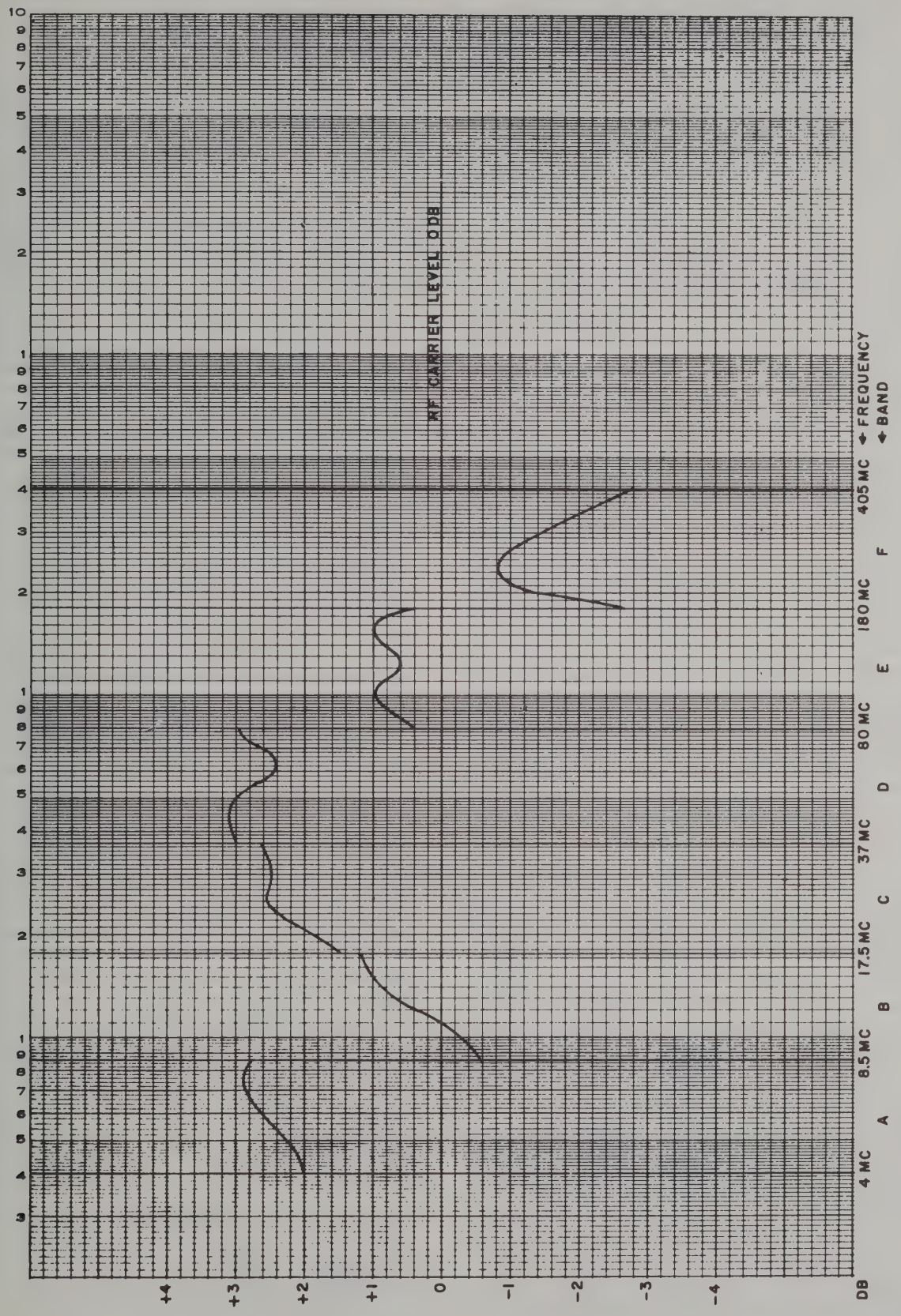


Figure 3-4. Chart of RF Pulse Voltage Determination.

3-7. EXTERNAL SINE WAVE MODULATION.

a. RF Signal Generator Set AN/URM-26B can be efficiently modulated by an external sine wave source at frequencies from 100 to 20,000 cycles per second.

b. For external sine wave modulation set up the signal generator according to paragraphs 3-4 and 3-5, then proceed as follows:

(1) Rotate % MODULATION control fully counterclockwise.

(2) Set the MOD & METER SELECTOR switch to EXT position in the % MOD sector.

(3) Connect the external modulation source to the signal generator at EXT MOD PULSE INPUT jack on the front panel.

(4) Use the % MODULATION control to vary the degree of carrier modulation as indicated on the % MODULATION scale of the panel meter.

(5) When it is necessary to change the frequency of rf output, proceed as outlined in paragraph 3-4.

3-8. EXTERNAL PULSE MODULATION.

a. The Signal Generator can be externally modulated by positive-going pulses having a repetition rate from 50 to 5000 pulses per second. For input versus rf output pulse duration see figure 3-3. The minimum pulse amplitude *must be* 40 volts for proper modulation characteristics. See figure 3-4 for RF pulse voltage determination. An analysis of the pulsing circuit is given in par. 4-3. It must be realized that the reading indicated on the dial of the rf output attenuator does not show the absolute output level of the pulse modulated signal. For a given pulse, the relative rf output amplitude can be varied by rotating the RF OUTPUT control; its absolute magnitude can be found from figure 3-4.

b. For external pulse modulation:

(1) Select the required carrier frequency, using the BAND SELECTOR and TUNING controls.

(2) Rotate the MOD & METER SELECTOR switch to PULSE position.

(3) Connect the source of external pulses to the signal generator at panel jack J103, which is now active in PULSE INPUT function.

(4) Adjust the amplitude of the signal rf output pulse by varying the RF OUTPUT attenuator (See figure 3-3 and 3-4). If greater accuracy of pulse width and amplitude is required, monitor the output with Oscilloscope AN/USM-38 and a UHF diode such as 1N126. See figure 4-6 for oscilloscope hookup.

NOTE

Do not attempt to vary the signal generator rf pulse output by varying the amplitude of the modulating pulse input. The signal generator contains a pulse limiting circuit which maintains constant rf pulse level input to the attenuator for modulating pulses of over 40 volts magnitude.

3-9. COUPLING TO EQUIPMENT UNDER TEST.

a. GENERAL.– Four coaxial cords, two that are four feet 1 inch long and two that are 7 inches long, each having a characteristic impedance of 50 ohms are provided for general purpose use in connecting the signal generator to equipment being tested. The following accessory items are furnished with the signal generator to provide proper termination and for introducing known losses into the output circuit: Impedance Matching Network CU-439/URM-26B (terminated in 50 ohms), Fixed Attenuator CN-315/URM-26B (6 db fixed loss pad), and Fixed Attenuator CN-316/URM-26B (20 db fixed loss pad). These accessories are designed to work into 50 ohms resistive impedance, both input and output. Their use in terminating the signal generator and in coupling to various impedances is explained in paragraphs 3-10, 3-11, 3-12 and 4-6. Table 3-2 summarizes the various possible load conditions described below and tabulates the specific termination solution.

b. EQUIPMENT WITH INPUT IMPEDANCE OF 50 OHMS. – When the input impedance (resistive) of the equipment being tested is 50 ohms, use one of the furnished RF cords to connect directly to the RF OUTPUT jack J101 on the front panel of the signal generator. The input impedance of the equipment matches the output impedance of the signal generator, therefore the input voltage to the equipment is that indicated directly on the RF OUTPUT attenuator dial. Additional theory is given in paragraph 4-6.

c. EQUIPMENT WITH INPUT IMPEDANCE LESS THAN 50 OHMS. – If the resistive impedance of the input circuit of the receiver or other equipment under test is less than 50 ohms, a non-inductive composition resistor may be added in series with the input element at the receiver under test, so that the sum of the receiver input impedance and the matching resistor will be 50 ohms (see figure 3-5). The total load impedance will then match the signal generator impedance at J101 and standing waves will be minimized. The actual receiver input voltage can be calculated from the formula shown as V LOAD in figure 3-5. As an example of the formula, if the load impedance of the receiver (Z) is equal to 30 ohms, a series matching resistor (R) of 20 ohms should be added in series with the receiver. Dial reading of 10,000 uv will then represent an actual receiver input as follows:

$$V_{LOAD} = \frac{Z \times V_{INDICATED}}{50} = \frac{30 \times 10{,}000}{50} = 6000 \text{ uv.}$$

To minimize leakage and other losses, this series resistance should be inserted as closely as possible to the input element of the receiver or instrument under test.

d. EQUIPMENT WITH INPUT IMPEDANCE SOMEWHAT GREATER THAN 50 OHMS. – With receiver

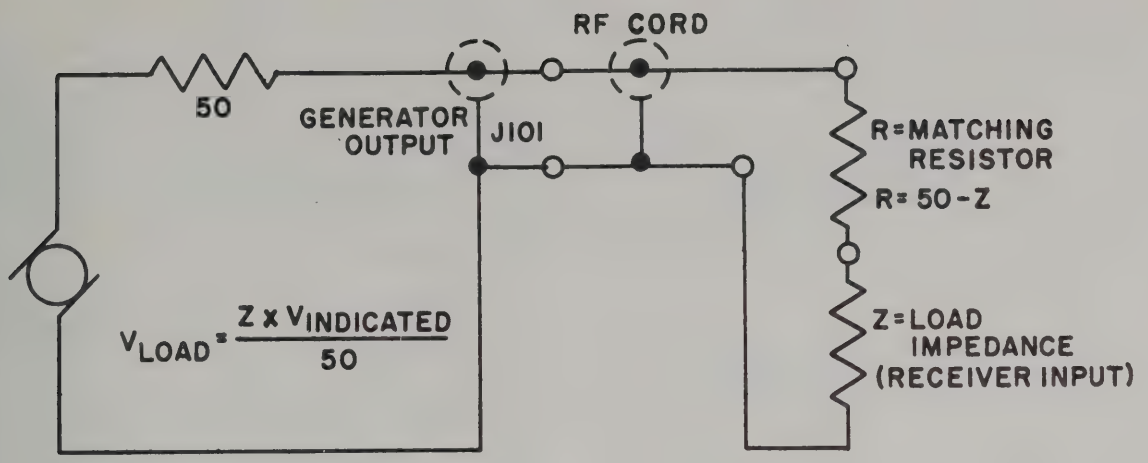


Figure 3-5. Equivalent Circuit of RF Output With Series Matching Resistor Added.

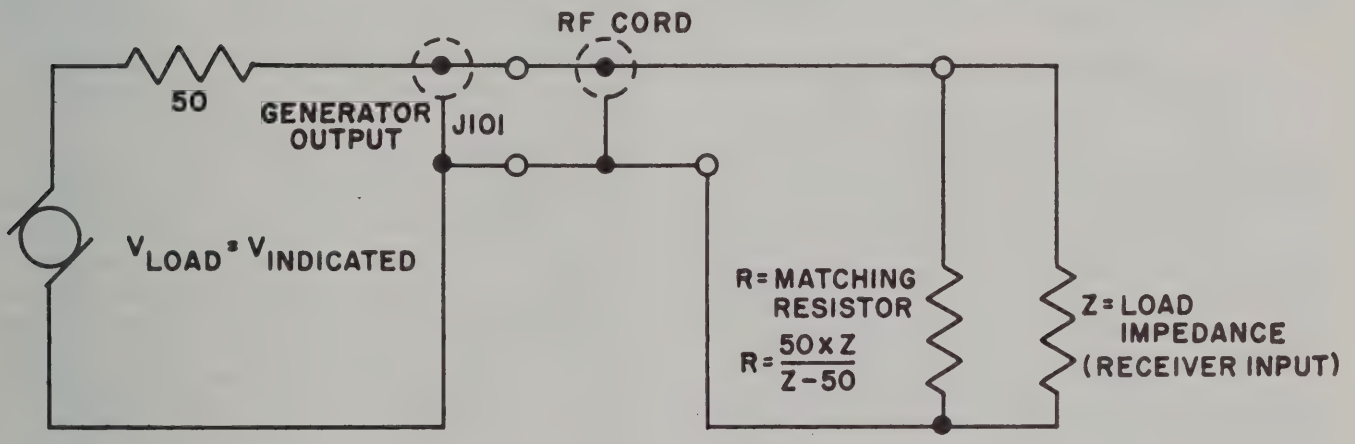


Figure 3-6. Equivalent Circuit of RF Output With Shunt Resistor Added.

input impedance above 50 ohms, but considerably less than 500 ohms, a non-inductive composition resistor should be added in parallel to the receiver input (shunt) as shown in figure 3-6. The equivalent impedance of the shunt matching resistor and the load should equal the generator impedance (50 ohms). The receiver input voltage will then be equal to the meter indication. For example, if the receiver input impedance (Z) is 120 ohms, select the correct shunt matching resistor (R) as follows:

$$R = \frac{50 \times Z}{Z - 50} = \frac{50 \times 120}{120 - 50} = \frac{6000}{70} = 85.07 \text{ ohms.}$$

It is apparent that meter M101 indication will be the same as the actual input voltage to the receiver.

e. RECEIVER INPUT IMPEDANCE CONSIDERABLY GREATER THAN 50 OHMS. – Where the receiver input impedance is considerably greater than 50 ohms, at values of say 300 to 500 ohms or even greater, a special case of (*d*) above exists, since the required shunt matching resistor approaches 50 ohms as the receiver input impedance passes approximately 500 ohms. Accordingly, a stock resistor of that value is available as Impedance Matching Network CU-439/URM-26B.

3-10. USE OF IMPEDANCE MATCHING NETWORK CU-439/URM-26B.

a. The network may be seen packed in the cover of the generator case in figure 1-1. It consists of a 51 ohm resistor with appropriate UG-1094/U connectors at each end. (See figure 3-7). In use it is connected as follows: Connector J501 (either end) mates with an end of any rf cord whose other end is plugged into RF OUTPUT jack J101. Connector J502 mates with any rf cord whose other end is plugged into receiver input (see figure 3-9). The dial reading will be approximately correct in microvolts. The rf output calibration will be inaccurate if the impedance matching network is used with receivers whose input impedance is well below 500 ohms; however, where it is

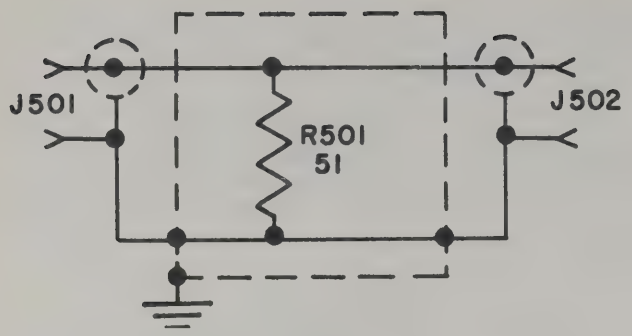


Figure 3-7. Schematic Diagram of Impedance Matching Network CU-439/URM-26B.

difficult to obtain a shunt matching resistor as indicated in paragraph 3-9*d*, the impedance matching network can be used for approximate readings with receiver inputs as low as 200 ohms.

3-11. USE OF FIXED ATTENUATOR CN-316/URM-26B (20db pad).

(See figure 3-8).

a. RECEIVER IMPEDANCE AT 50 OHMS. – Where it is desired to cut the RF OUTPUT to one-tenth the reading on the dial (20 db loss) the Fixed Attenuator CN-316/URM-26B is introduced between the output of the signal generator and the input of the receiver (see figure 3-9). Where the input of the receiver is 50 ohms (matching the output of the signal generator), simply divide the apparent reading on the RF OUTPUT dial by the factor of TEN.

b. RECEIVER IMPEDANCE LESS THAN 50 OHMS.– Where the input impedance of the receiver is less than 50 ohms, it will be necessary to insert a series matching resistor between the attenuator and the receiver input as described in paragraph 3-9*c*. To find the attenuated reading:

Dividing Factor = 500/ Receiver Z.

Thus; if the input impedance of the receiver is 25 ohms, and the 10:1 attenuator is placed with one end at the output of the signal generator, and the other end at the input of the receiver, with a 25 ohm composition resistor in series with the receiver input and the attenuator to make the proper match –

Dividing Factor = 500/25 = 20.

Thus the microvolt reading on the RF OUTPUT dial would be divided by 20 to show the number of microvolts available at the receiver input at that setting.

c. RECEIVER IMPEDANCE SOMEWHAT GREATER THAN 50 OHMS. – Where the receiver input is above 50 ohms, but considerably less than 500 ohms, and it is desired to show a 10:1 attenuation, connect the attenuator between signal generator and receiver, with a non-inductive composition resistor added in parallel to the receiver (shunt) as shown in input figure 3-6. The equivalent impedance of the shunt matching resistor and the load should equal 50 ohms. See paragraph 3-9*d* for method of determining shunt resistor value. Now, simple divide the microvolt reading of the RF OUTPUT dial by TEN.

d. RECEIVER IMPEDANCE CONSIDERABLY GREATER THAN 50 OHMS. – Where the receiver input impedance is considerably greater than 50 ohms, at values of say 300 or 500 ohms or even greater, a special case of (*c*) above exists, since the required shunt matching resistor approaches 50 ohms as the receiver input impedance passes approximately 500 ohms. Accordingly, connect Impedance Matching Network CU-439/URM-26B through rf cord to the receiver input, then connect Fixed Attenuator CN-316/URM-26B to the impedance matching network, connecting the other end of the fixed attenuator through rf cord to the signal generator. Now, simply divide the micro-

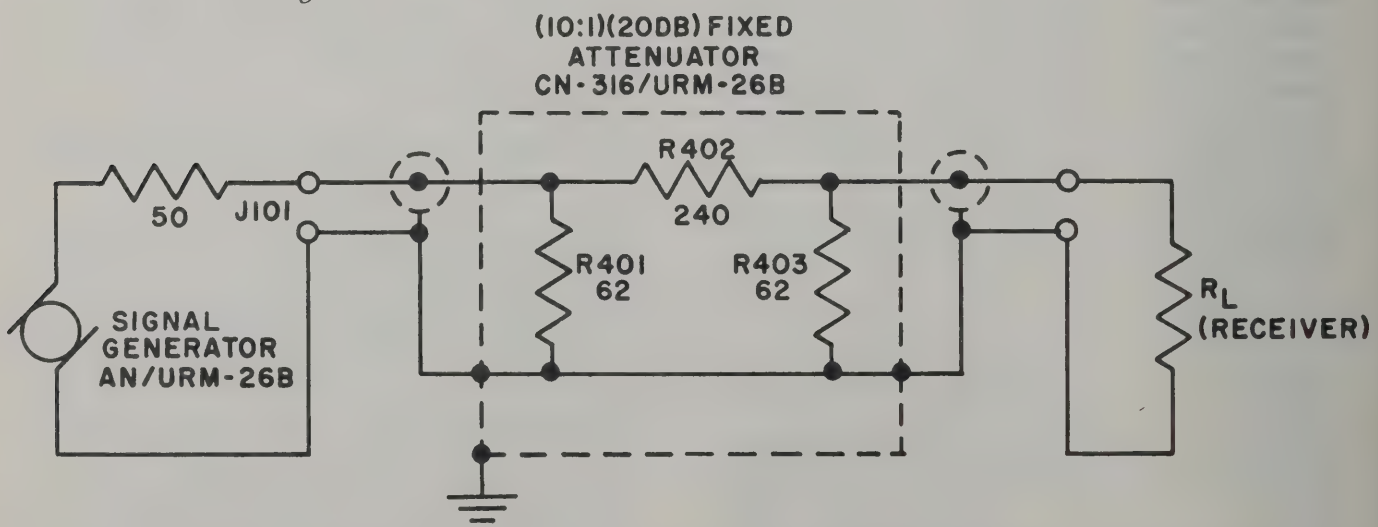


Figure 3-8. Equivalent Circuit of Output of Signal Generator With (10:1) Fixed Attenuator CN-316/URM-26B.

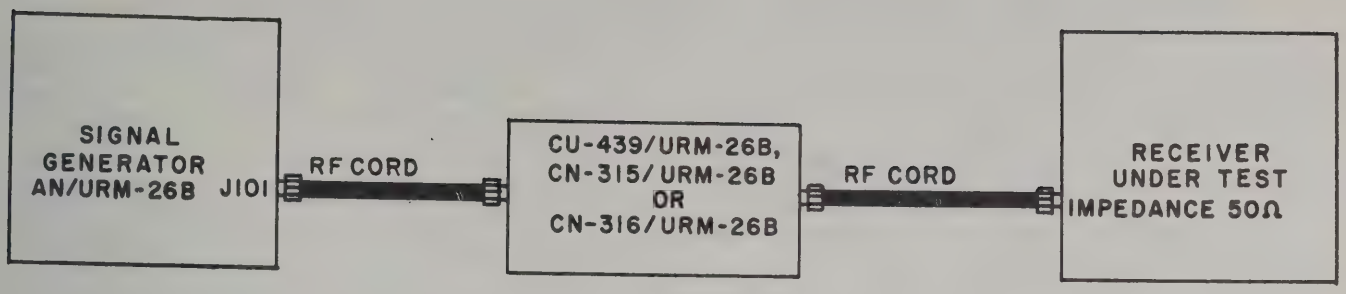


Figure 3-9. Method of Inserting Attenuators and Matching Network Between Signal Generator and Receiver.

volt reading of the RF OUTPUT dial by TEN.

e. SPECIAL CASE WHERE RECEIVER IMPEDANCE IS GREATER THAN 50 OHMS BUT MUCH LESS THAN 300 OHMS. – Where it is desired to use the 10:1 loss of the fixed attenuator in equipment whose input impedance is between 50 and 300 ohms, it is unnecessary to use matching shunt resistances such as impedance matching network or calculated composition resistor. The 10:1 attenuator is designed so that no matter what impedance is placed across its output, approximately 50 ohms is reflected to the signal generator. However, the output of the fixed attenuator will equal 1/10 the voltage indicated by the RF OUTPUT dial only when a 50 ohm load is connected across its output. When the input impedance of the receiver is some value other than 50 ohms, as it would be in this special case, a correction factor must be applied to the reading. The apparent reading on the RF OUTPUT dial is then multiplied by the correction factor to find the true reading in microvolts at the receiver input.

$$\text{Correction Factor} = \frac{Z_L}{4.8\,(Z_L + 62)}$$

EXAMPLE: With input impedance Z_L of 100 ohms, using the 10:1 attenuator, what will be the true reading in microvolts at the receiver input if the RF OUTPUT dial reads 10,000 microvolts?

$$\text{SOLUTION:} \quad \frac{Z_L}{4.8\,(Z_L + 62)} = \frac{100}{4.8\,(100 + 62)} =$$

$$\frac{100}{4.8 \times 162} = \frac{100}{777.6} = .1286$$

Using the multiplication factor of .1286 against the apparent reading, 10,000 x .1286 = 1286 microvolts true value.

EXAMPLE: With input impedance Z_L of 70 ohms, using the 10:1 attenuator, what will be the true reading in microvolts at the receiver input if the RF OUTPUT dial reads 15,000 microvolts?

$$\text{SOLUTION:} \quad \frac{70}{4.8\,(70 + 62)} = \frac{70}{4.8 \times 132} = \frac{70}{633.6} =$$

correction factor of .1104, 15,000 x .1104 = 1656 uv (approximately).

f. DECADE CHECKING.– Besides being very useful in the termination applications described above, the 10:1 fixed attenuator can also be used for checking the decades of the signal generator variable output attenuator AT101 and for obtaining a 10:1 or 20 db attenuation at the receiver without changing the setting of the signal generator. The attenuator calibration procedure is discussed in Section 6.

3-12. USE OF FIXED ATTENUATOR CN-315/URM-26B (6 db pad).

(See figure 3-8 for general diagram; actual component values differ from those shown).

a. RECEIVER IMPEDANCE AT 50 OHMS. – Where it is desired to cut the RF OUTPUT value exactly in half (6 db loss) the Fixed Attenuator CN-315/URM-26B is introduced between the output of the signal generator and the input of the receiver as shown in figure 3-9. (The method of inserting the fixed attenuator shown in figure 3-9 may be used for either the 2:1 unit or the 10:1 unit). The schematic diagram of Fixed Attenuator CN-315/URM-26B may be found at the bottom of the main schematic diagram, figure 6-16. Where the input of the receiver is 50 ohms (matching the output of the signal generator), simply divide the apparent reading on the RF OUTPUT dial by the factor of TWO.

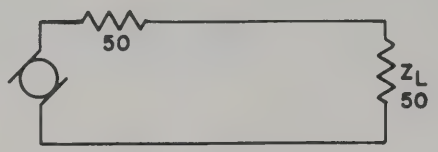
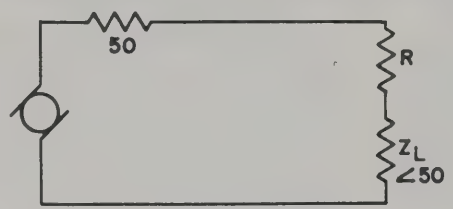
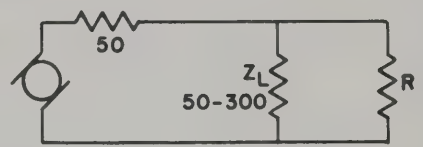
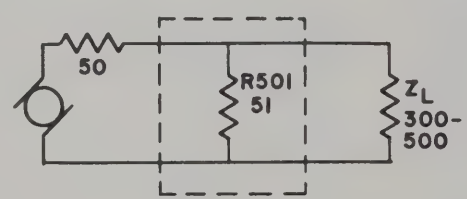
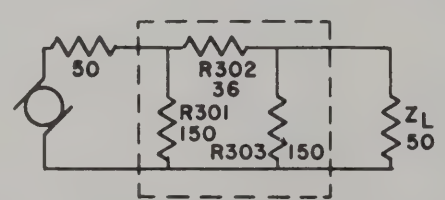
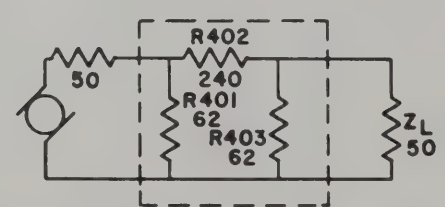
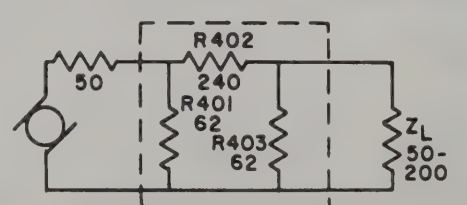
b. RECEIVER IMPEDANCE LESS THAN 50 OHMS.– Where the input impedance of the receiver is less than 50 ohms, it will be necessary to insert a series matching resistor between the attenuator and the receiver input as described in paragraph 3-9*c*. The real voltage at the receiver input will be something less than half the RF OUTPUT reading. To find the attenuated reading:

Dividing Factor = 100/Receiver Z.

Thus; if the input impedance of the receiver is 30 ohms, and the 2:1 attenuator is placed with one end at the output of the signal generator, and the other end at the input of the receiver, with a 20 ohm composition resistor in series with the receiver input and the attenuator to make the proper match -

Dividing Factor = 100/30 = 3.33.

TABLE 3-2. CORRECT METHODS FOR TERMINATING THE SIGNAL GENERATOR AT J101.

LOAD IMPEDANCE	CIRCUIT	ACCESSORY RESISTOR	VOLTAGE APPLIED TO LOAD	REF PAR
50 OHMS		NONE	DIRECT READING	3-9b
LESS THAN 50 OHMS		$R = 50 - Z_L$	$\frac{Z \times V_{INDICATED}}{50}$	3-9c
SOMEWHAT GREATER THAN 50 OHMS (50-300 OHMS)		$R = \frac{50 \times Z}{Z - 50}$	DIRECT READING	3-9d
CONSIDERABLY GREATER THAN 50 OHMS (300-500 OHMS)		IMPEDANCE MATCHING NETWORK CU-439/URM-26B	DIRECT READING	3-9e
50 OHMS WITH 2:1 ATTENUATION		FIXED ATTENUATOR CN-315/URM-26B	$\frac{V_{INDICATED}}{2}$	3-12a
50 OHMS WITH 10:1 ATTENUATION		FIXED ATTENUATOR CN-316/URM-26B	$\frac{V_{INDICATED}}{10}$	3-11a
SPECIAL CASE: 50-200 OHMS WITH 10:1 ATTENUATION		FIXED ATTENUATOR CN-316/URM-26B	CORRECTION FACTOR x $V_{IND.}$ CORRECTION FACTOR = $\frac{Z_L}{4.8(Z_L + 62)}$	3-11e

Thus the microvolt reading on the RF OUTPUT dial would be divided by 3.33 to show the number of microvolts available at the receiver input at that setting.

c. RECEIVER IMPENDANCE MORE THAN 500 OHMS. – Where the receiver input is more than 500 ohms, and it is desired to show a 2:1 attenuation, connect the attenuator to the output of the signal generator, then connect the Impedance Matching Network CU-439/URM-26B between attenuator and receiver input. Now, simply divide the microvolt reading of the RF OUTPUT dial by TWO.

d. RECEIVER IMPEDANCE BETWEEN 50 OHMS AND 500 OHMS. – Connect the attenuator to the signal generator as described in (*c*) above. Instead of the impedance matching network between the attenuator and receiver input, use appropriate shunt matching resistor as shown in figure 3-6. Now simply divide the microvolt reading of the RF OUTPUT dial by TWO. Unlike the 10:1 attenuator, the 2:1 attenuator is not a constant impedance device, and must therefore always be terminated in 50 ohms in order to reflect a 50 ohm impedance.

3-13. SUMMARY OF OPERATION.

a. GENERAL. – The previous paragraphs in this section discuss in detail the operational procedures for extending the specific uses of RF Signal Generator Set AN/URM-26B. These principles may be applied as required and as determined by the needs of the measurement being made. The purpose of this paragraph is to give a simplified summary of the necessary operations. These operations are pictorially represented in figure 3-10.

b. STEPS IN OPERATION.

STEP 1. Turn POWER switch S103 to OFF.

STEP 2. Turn the CARRIER LEVEL control completely counterclockwise.

STEP 3. Rotate % MODULATION knob fully counterclockwise.

STEP 4. Insert power plug P102 into the source of 115V ac.

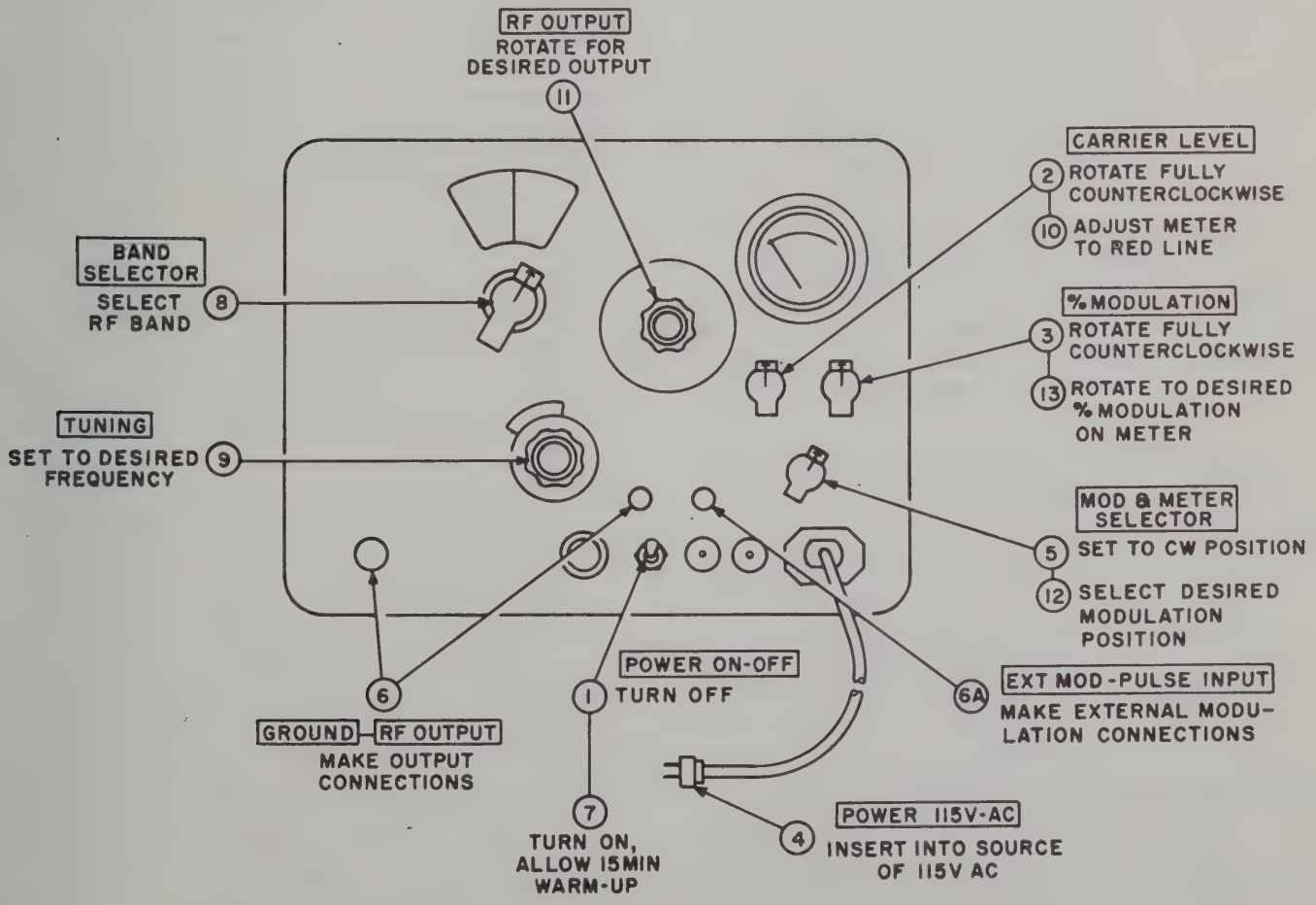


Figure 3-10. Simplified Procedure for Operating RF Signal Generator Set AN/URM-26B.

STEP 5. Turn MOD and METER SELECTOR switch to CW position.

STEP 6. Make necessary output connections (paragraph 3-9). Output jack J101 is marked RF OUTPUT on panel. If exterior modulation is used, that signal is fed in through J103 marked EXT MOD PULSE INPUT on panel. Connect GROUND terminals of all equipment to each other and to physical ground (if practicable).

STEP 7. Turn POWER switch to ON. Permit a 15 minute warmup.

STEP 8. Select frequency band with BAND SELECTOR switch.

STEP 9. Select frequency with TUNING dial, reading frequency directly from MEGACYCLES window.

STEP 10. Adjust meter M101 to read directly at the red line by rotating CARRIER LEVEL control knob.

STEP 11. Rotate RF OUTPUT control knob for desired output.

STEP 12. Set MOD and METER SELECTOR switch to the appropriate modulation signal: 400 cycles or 1000 cycles for internal audio signal, EXT for any external modulation, CW for unmodulated rf, and PULSE for external pulse modulation.

STEP 13. Rotate % MODULATION knob for desired percentage of modulation on meter.

Steps 1 to 11 above are adequate for CW conditions. Steps 12 and 13 cover internal or external sine wave modulation. Omit steps 10 and 13 for pulse operation. Recommended hookup for observing pulse waveform is shown in figure 4-6.

3-14. GENERAL INSTRUCTIONS FOR USE AND SUPPLEMENTARY DATA.

a. GENERAL. – The operational principles outlined in this section are general and should be supplemented by the specific data applicable to the equipment being tested. The particular receiver instruction book should be consulted before making any of the following signal generator tests.

CAUTION

Never connect the RF OUTPUT jack J101 directly to a DC potential since this would very likely burn out termination resistor R130. When making interstage measurements on a receiver, connect a .01 uf capacitor in series with J101 and the receiver point being measured. It must be realized that when this capacitor is so inserted, the voltage indication on RF OUTPUT scale will not reflect an absolutely accurate input voltage to the receiver

b. RECEIVER TESTS.

(1) SENSITIVITY. – At high radio frequencies, antenna characteristics cannot be easily reproduced, and considerable care must be taken in making receiver sensitivity tests. The voltage available at output jack J101 is always known, but not the voltage at the receiver input terminals a few feet away. This latter voltage is proportional to the signal generator output, but it may be larger or smaller because of the characteristics and terminations of the "transmission line" between the instruments (see par. 3-9). Furthermore, some radio receivers have an excess of sensitivity such that at certain frequencies, the inherent noise level is sufficient to saturate the dedetector or audio tubes, if the receiver gain controls are advanced too far. Accordingly, all receivers are measured and rated for both CW and MCW sensitivity on the basis of the sensitivity, volume or gain controls being adjusted so that not more than 60 microwatts of noise is present in the output with no input signal impressed. A dbm (decibel milliwatt) scale is provided on the RF OUTPUT dial for measuring the overall sensitivity of the receiver under test directly in dbm. This dbm scale applies only when the input impedance of the receiver is 50 ohms. This scale is marked from −7dbm (100,000 microvolts) to −123 dbm (.1 microvolts). For example; if the minimum detectable sensitivity of a receiver is 1 microvolt, the scale shows that this sensitivity also represents −107 dbm.

CAUTION

Consult the particular receiver's instruction book for details of the method applicable to that receiver. This is particularly important for wide-band RF or IF amplifiers where overcoupled, regenerative or stagger-tuning is used. Be sure the aligning frequency is correct. Check with a heterodyne frequency meter such as Navy Model LM-13 Frequency Meter and Frequency Meter TS-323/UR or equal to obtain greater frequency accuracy than obtainable with the signal generator.

(2) ALIGNMENT OF NARROW BAND RF OR IF RECEIVERS. – The presence of incidental or parasitic frequency modulation in an AM signal generator may introduce asymmetry in the apparent selectivity curve of the receiver being tested. The effects of frequency modulation in RF Signal Generator Set AN/URM-26B have been kept at a minimum with the incorporation of a frequency compensating network (par. 4-2c). For best results, especially in aligning narrow band stages, the technician should perform all of the following receiver tests (except audio response) by using unmodulated carrier signal. In order to eliminate the need for modulation, insert a high im-

pedance dc voltmeter, such as contained in Electronic Multimeter ME-25A/U, across the load of the receiver second detector. Alignment should then be performed to peak response on this meter.

(3) RECEIVER ALIGNMENT. – The alignment of the intermediate frequency amplifier system of a simple receiver is usually carried out by setting up the signal generator at the proper frequency and working step by step backward through the IF circuits from the second detector to the first detector. Always apply the signal generator to the grid immediately preceding the circuit under adjustment and adjust the trimmers (or variable inductances) for maximum output. In carrying out this procedure, it will be necessary, of course, to reduce the output of the signal generator each time the signal is applied to the grid of a tube at lower power level. In some cases the alignment instructions for the receiver specify that the signal generator input is at a definite point in the receiver and is not changed during the alignment. The next step is to align the radio frequency and oscillator circuits of the receiver. This is accomplished by setting the receiver dial near the high end of the band in question and applying a signal to the input terminals of the receiver. First adjust the RF stage shunt trimmer capacitor for maximum receiver output and then adjust the oscillator shunt trimmer until the receiver output is maximum. The receiver and signal generator frequency scales are then set at the low frequency ends and the oscillator series padder capacitor is adjusted for maximum output. Recheck the high frequency end of the band and repeat the above procedure as necessary.

(4) SELECTIVITY. – The selectivity of a radio receiver is that characteristic which determines the extent to which the receiver is capable of distinguishing between the desired signal and disturbances of other frequencies. Selectivity is expressed in the form of a curve that gives the signal strength required to produce a given receiver output at various frequencies, with the response at resonance taken as the reference. This selectivity is normally obtained by disabling the automatic volume controls system of the receiver, setting the signal generator to the desired frequency, tuning the receiver to this frequency and modulating the carrier signal 30 percent at 400 cycles. The signal generator frequency is then varied by progressive amounts from the receiver tuned frequency, and the signal generator voltage increased as necessary to maintain a controlled receiver output. The unmodulated CW method as described in paragraph 3-14b(2) can also be used. Unless otherwise specified, the normal receiver output is usually taken as 6 milliwatts into 600 ohms.

(5) AUDIO RESPONSE. – The audio response of a receiver shows the manner in which the electrical output of a dummy load depends upon the modulation frequency. In making this test, connect an audio oscillator such as Navy Model LAJ series, to EXT MOD PULSE INPUT jack J103. Switch MOD and METER SELECTOR to EXT position. Select the desired signal generator frequency and tune the receiver under test to this frequency. Adjust the signal generator for a convenient output. Observe the variation in receiver output as the audio frequency is varied from 400 cycles, keeping the degree of modulation constant at 30 percent. The results of such an audio response test are expressed in the form of a curve with the ratio of actual output to 400 cycle output plotted vertically, and each corresponding audio frequency plotted horizontally. In making this test, care must be taken to avoid overloading the receiver. In the event that the receiver noise or hum level is appreciable, it will be necessary to apply a strong enough signal from the generator to override this interfering effect.

(6) MEASURING RECEIVER GAIN PER STAGE. – RF Signal Generator Set AN/URM-26B is also a useful device for measuring the gain of any particular receiver stage. This is accomplished by applying a signal to the input (and output points) of the stage in question and recording the signal generator voltage required to give the same output at each point. The gain in db is then calculated by:

$$\text{GAIN (db)} = 20 \log \frac{V_{out.}}{V_{in}}$$

c. STANDARD LEVELS. – Standard receiver reference levels are defined as follows:

(1) Standard output level of reference = 6 milliwatts.
(2) Standard noise level = 600 microwatts.
(3) Standard output load = 600 ohms for low impedance output or 20,000 ohms for high impedance output, unless special impedances are provided in the receivers as noted in their instruction books.

d. VOLTMETER USED AS AN OUTPUT METER. – In making measurements when a voltmeter is used as an output meter, the following approximate wattages correspond to the voltages at the load impedance noted:

(1) 1.9 volts at 600 ohms 11.0 volts at 20,000 ohms	6 milliwatts.
(2) 0.19 volts at 600 ohms 1.1 volts at 20,000 ohms	60 microwatts.
(3) 0.77 volts at 600 ohms 4.5 volts at 20,000 ohms	1 milliwatt.

(4) For receivers provided with output meters having a zero level of 6 milliwatts, –20 decibels equals 60 microwatts.

(5) For receivers provided with output meters having a zero level of 60 microwatts, +20 decibels equals 6 milliwatts.

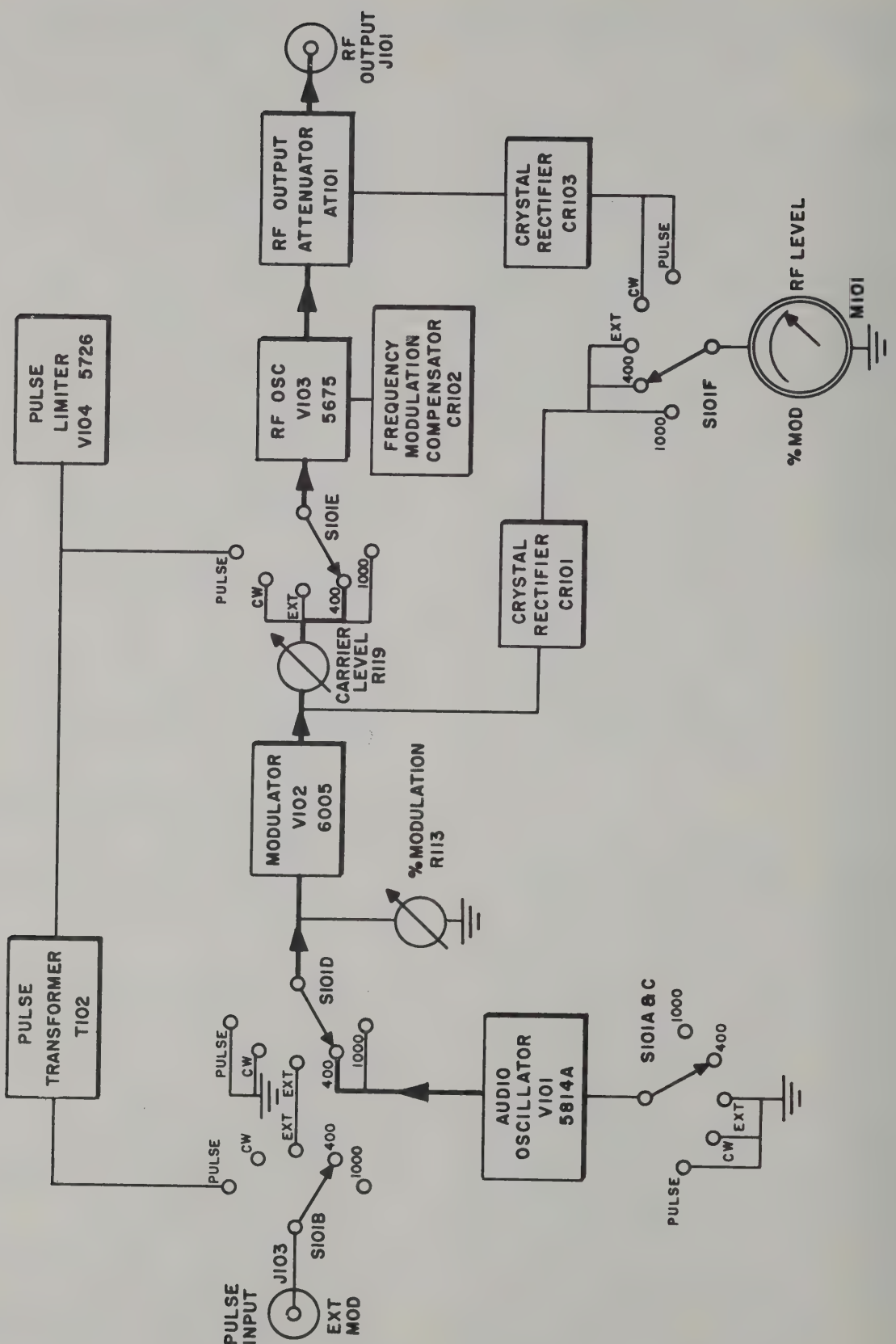


Figure 4-1. RF Signal Generator Set AN/URM-26B, Functional Block Diagram.

SECTION 4

PRINCIPLES OF OPERATION

4-1. GENERAL DESCRIPTION OF CIRCUITS.
(See figure 4-1)

A simple way of describing RF Signal Generator Set AN/URM-26B is to consider it a small radio transmitter with provision of straight CW operation, modulated CW (as an am transmitter), and pulse modulation when the pulse signal is supplied externally. Switch S101A and C (in the lower left of the diagram) selects 1000 cycles or 400 cycles as the desired modulating frequency for the audio oscillator V101. When switched to EXT, CW or PULSE operation, the audio oscillator is inoperative. When operating on 400 or 1000 cycles, the audio oscillator generates either of those two frequencies (as switched) and passes the signal through S101D to modulator V102. Where CW or PULSE modulation is desired, the modulator stage is grounded by S101D. Where external modulation is provided, S101D permits the external signal to enter by way of S101B from PULSE INPUT EXT MOD jack J103 located on the front panel. If the external modulation is a pulse signal, S101B feeds that signal through pulse transformer T102, with limiting action on the pulse being supplied by pulse limiter V104, and the limited pulse signal is fed to S101E. The percentage of modulation (400 cycles, 1000 cycles or external sine wave) is read on the front panel meter, set by % MODULATION control R113. The output of the modulator is indicated on the front panel meter, and can be set to a predetermined level by CARRIER LEVEL control R119. It is the only signal modulating rf oscillator V103 except when pulse modulation is switched in by S101E. Since voltage-regulated-power source supplies the voltages for the rf oscillator (through all positions except CW and PULSE on S101E) a reading of the audio output of the modulator can be read as a function of modulation percentage. Accordingly, a sample of signal from output of modulator V102 is rectified by crystal rectifier CR101 and is read on meter M101 when appropriately switched in by S101F. The normal sine modulation or pulse modulation is fed through S101E to RF Oscillator V103, which is a variable frequency rf oscillator. Rectifier CR102 is part of the frequency modulation compensator (see paragraph 4-2c). The output of V103 (depending upon switching) is cw, am-rf, or pulse-modulated rf. This output is attenuated by rf output attenuator AT101, and is available at the RF OUTPUT jack J101 on the front panel. A small amount of rf is rectified by crystal rectifier CR103 to provide a reading on the panel meter when S101F is in the CW or PULSE position. A detailed analysis of the principal circuit assemblies is covered in this section under the following headings and paragraphs:

a. CW OPERATION . . . . . Par. 4-2
b. CARRIER OSCILLATOR . . . . . Par. 4-2*b*
c. FREQUENCY MODULATION COMPENSATOR . . . . . Par. 4-2*c*
d. CARRIER LEVEL MEASURING CIRCUIT . . . . . Par. 4-2*d*
e. VARIABLE RF OUTPUT ATTENUATOR . . . . . Par. 4-2*e*
f. PULSE TRANSFORMER . . . . . Par. 4-3*a*
g. PULSE LIMITER . . . . . Par. 4-3*b*
h. AUDIO OSCILLATOR . . . . . Par. 4-4*a*
i. MODULATOR . . . . . Par. 4-4*b*
j. % MODULATION CIRCUIT . . . . . Par. 4-4*c*
k. EXTERNAL MODULATION CIRCUIT . . . . . Par. 4-5
l. TERMINATING THE SIGNAL GENERATOR . . . . . Par. 4-6
m. POWER SUPPLY PP-1215/URM-26B . . . . . Par. 4-7

4-2. CW OPERATION.
(see figure 4-2.)

a. GENERAL. – When switches S101C, D and E are turned to the CW position, modulator V102 is grounded through S101D, removing the modulation action from the circuit. Regulated +210 v passes through T101, CARRIER LEVEL control R119, S101E, through Z103, L109 and R123 to supply the plate of rf oscillator V103 through its plate coil L113. The rf oscillator V103 is now free to supply unmodulated signal to its output.

b. CARRIER OSCILLATOR. – The carrier oscillator (V103) is completely enclosed in a separate shielded compartment, located on the right side of

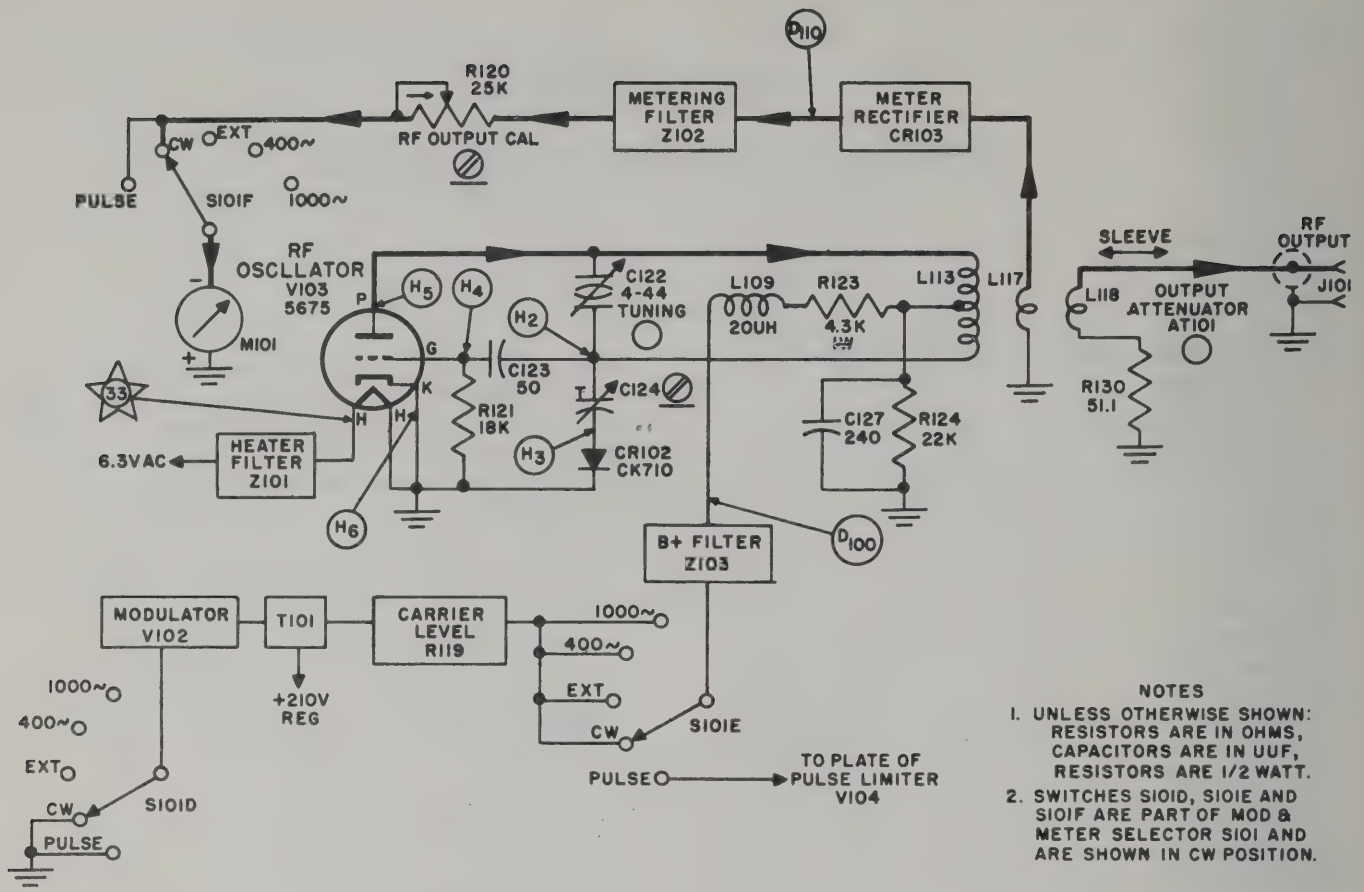


Figure 4-2. Simplified Schematic Diagram of the RF Oscillator, Set at Band C.

Signal Generator SG-117/URM-26B when viewed from the rear. The stage operates as a Hartley oscillator on bands A through D by virtue of the tapped plate tank coil L113 being by-passed to ground at its center-tap, through C127, thus providing a coil center-tap connection for the cathode (also at ground potential). Bands A through D have the center-tap of the plate coil grounded similarly. At the two highest bands, the center-tap of the plate coil is above ground. Since the frequencies involved are so high, the interelectrode capacities of V103 predominate, providing a virtual split capacity, with ungrounded center-tap, generally called an ultra-audion oscillator. The six plate coils are mounted on a turret, rotated by the BAND SELECTOR knob on the front panel. Oscillator tube V103 is a type 5675 pencil-type triode, mounted on plated snap-in contacts built on the same sub-assembly that contains the main tuning capacitor C122. Plate voltage and modulation (where used) are introduced through rf choke L109 and dropping resistor R123 (figure 4-2.) as well as through B+ filter Z103. Additional rf filtering is provided by heater filter Z101 not shown in this partial schematic diagram. Class C bias for V103 is developed across grid leak resistor R121 in association with grid blocking capacitor C123. Capacitor C127 provides a low impedance ground path for the center-tap of L113. Resistor R124 keeps the coil center-tap well above dc ground.

c. FREQUENCY MODULATION COMPENSATOR.– Although of no concern in cw operation, parasitic frequency modulation may occur when the carrier oscillator is amplitude modulated. The spurious fm increases the band width of the modulated signal and is undesirable for aligning narrow band receivers. The reason for parasitic fm is best explained in terms of the variable reactance introduced by the modulating signal across the oscillator tank. When the audio modulating voltage is applied to oscillator tank coil L113 (figure 4-2.), the instantaneous plate resistance Rp of oscillator V103 is varied accordingly. See figure 4-3 for the equivalent circuit. The only change has been in the arrangement on the paper. The circuit is the same as figure 4-2. The variation in instantaneous plate resistance is shown as a variable resistor Rp. At the same time the second half of the tank coil is across the grid circuit. Across the grid coil is the

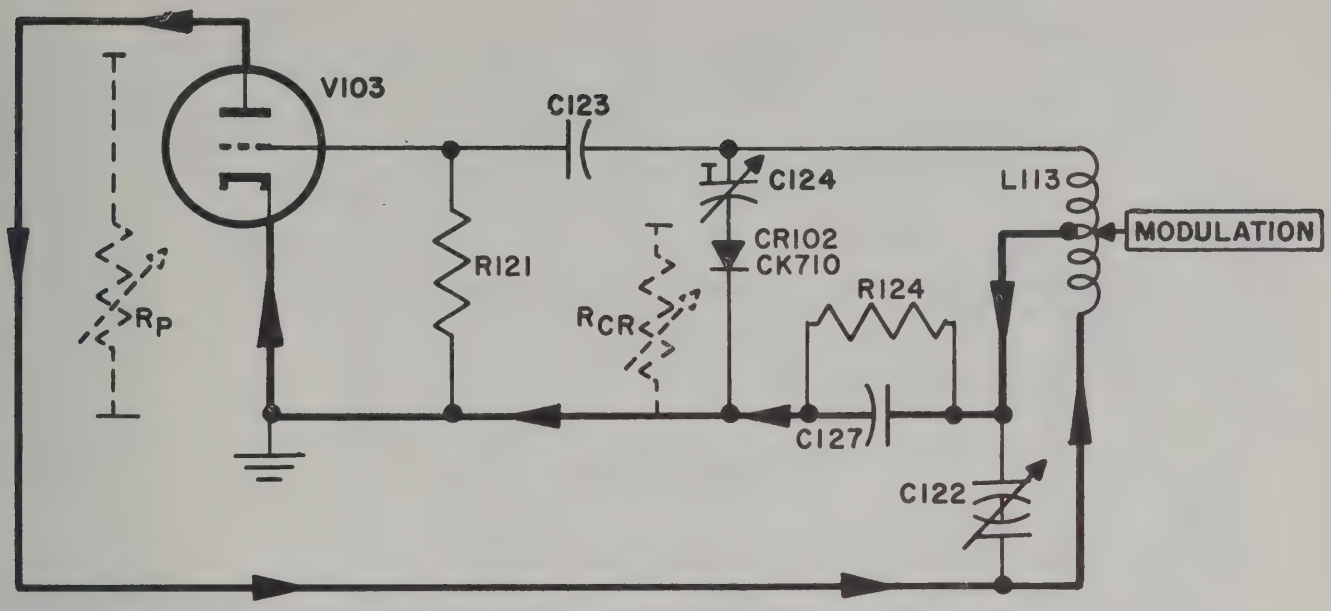


Figure 4-3. Equivalent Circuit of RF Oscillator With Frequency Modulation Compensator.

FM Compensator, consisting of diode CR102 and a small factory-set trimmer, C124, which allows some of the tank energy to pass through the diode. The diode is a rectifier, thus acting as variable resistor in the grid circuit to offset the variable resistance Rp in the plate circuit. Since grid and plate ends of the tank coil are 180° apart, their opposing variable resistances (which vary as the modulation) cancel out, minimizing the frequency shift of the carrier tank frequency.

d. CARRIER LEVEL MEASURING CIRCUIT. – (See figure 4-4.) The carrier level is measured *only in CW position* of MOD and METER SELECTOR knob. A small loop (L117) between the rf oscillator tank circuit and the output coil takes off a small portion of the carrier energy, rectifies it with CR103 and filter C129, R129. The rectified voltage of carrier level passes through Z102 metering filter consisting of C114, L103, C115, L104, C116, L105 and C117. Because of large circulating rf currents in the region of the oscillator tank circuit, filter Z102 is required to remove any trace of rf from the carrier level measuring line. The rectified filtered voltage is factory-set for a balanced zero reading by means of Rf Output Cal R120. It is a screwdriver adjustment behind the panel and does not require re-setting during normal operation. The rectified voltage passes through S101F and is read on M101. The B+ supply for the rf oscillator tank is fed through Z103 B+ Filter, switched in through S101E, controlled by CARRIER LEVEL control R119 in series with the +210 volts (regulated) fed through T101. When set for CW operation the rf oscillator plate voltage is controlled by CARRIER LEVEL control on the front panel. The control is varied for the appropriate carrier frequency until M101 needle is at the red arrow.

e. VARIABLE RF OUTPUT ATTENUATOR. – (See figure 4-4.) The output coil L118 feeds the rf output, whether cw or modulated, to RF OUTPUT jack, J101, on the front panel. The output terminating resistor R130 is within the attenuator casing. The attenuator AT 101 is the Waveguide-Below-Cutoff type in which L118 is moved by a gear arrangement within a waveguide, varying its energy-pickup from the oscillator coil. The gearing includes the RF OUTPUT dial on the front panel, which reads directly on the outer logarithmic scale in microvolts and on the inner linear scale in (–) dbm.

4-3. PULSE MODULATION CIRCUIT.

(See figure 4-5 and 4-6.)

a. PULSE TRANSFORMER. – RF Signal Generator Set AN/URM-26B can be externally pulse modulated (via J103). The minimum pulse amplitude of the external source must be 40 volts, with a repetition rate between 50 and 5000 pps. A suggested oscilloscope hookup to observe pulse waveform is shown in figure 4-6. The simplified schematic diagram of the pulse modulation circuit is shown in figure 4-5. The pulse modulating signal is applied to the plate of rf oscillator tube V103 via EXT MOD PULSE INPUT jack J103, rf filter choke L121, switch S101B, pulse transformer T102, limiting resistors R133 and R131, switch S101E, B+ filter Z103 and oscillator coil. Note that the only plate supply for the rf oscillator stage is the pulse voltage. Thus, with no pulse signal present, the rf oscillator ceases to operate. As the positive pulse voltage is applied to the oscillator tank, the oscillator plate is momentarily positive, permitting the oscillator to funtion *for the duration of the pulse voltage.* Consequently the rf out-

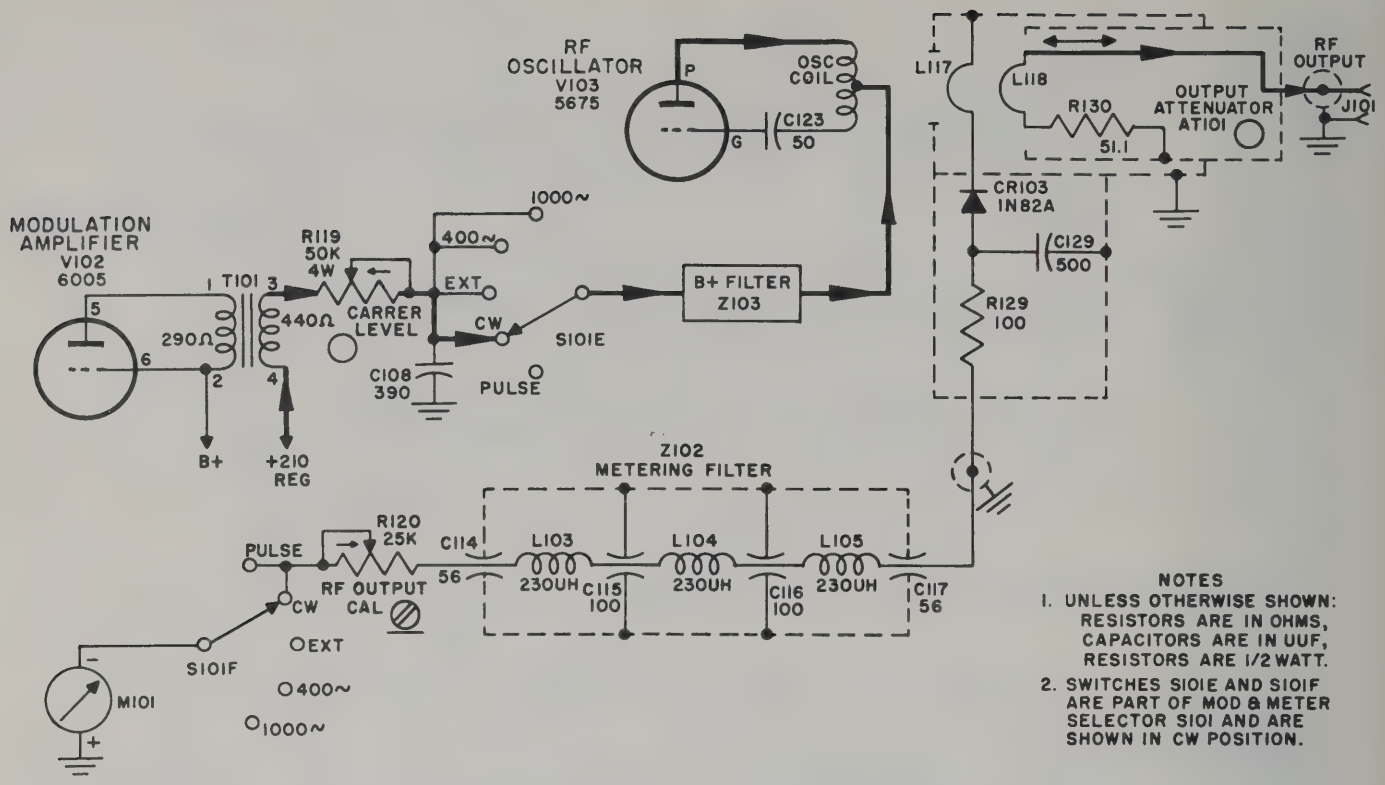


Figure 4-4. Simplified Schematic Diagram of the Waveguide-Below-Cutoff Attenuator and RF Level Monitoring.

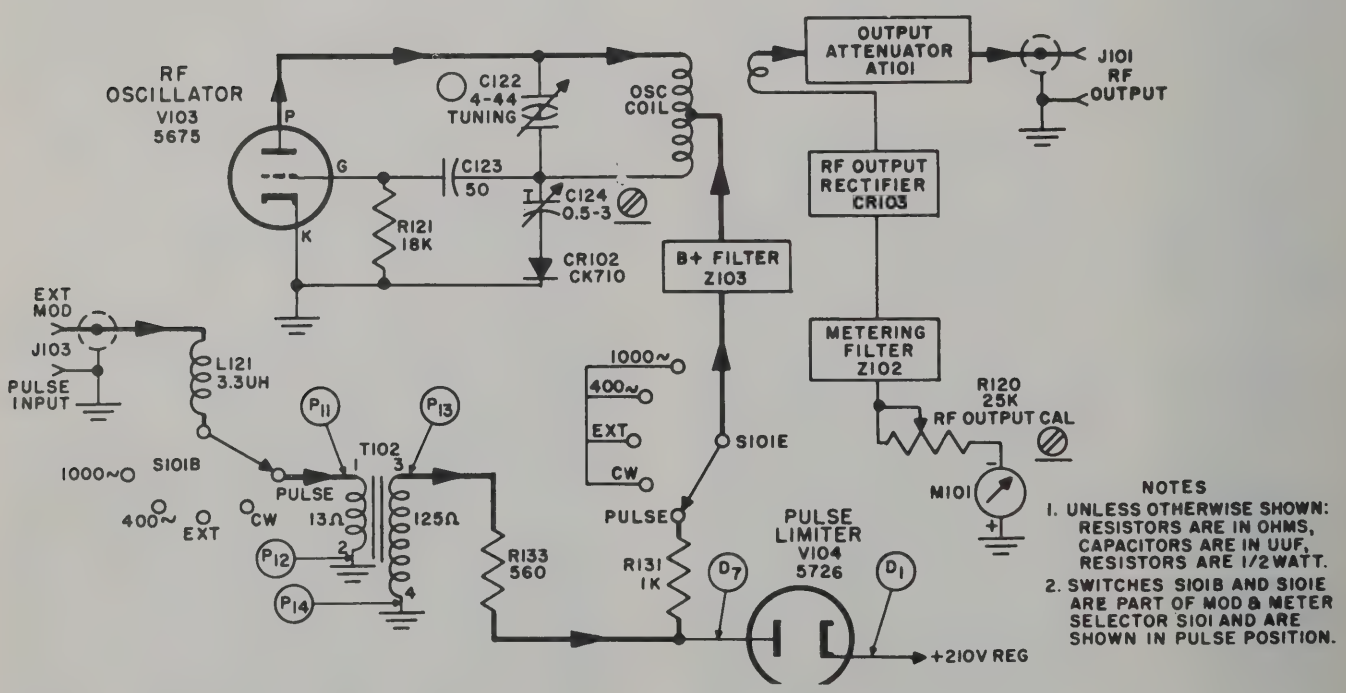


Figure 4-5. Simplified Schematic Diagram Showing Pulse Limiter and RF Oscillator Stages When Switched to Pulse Position.

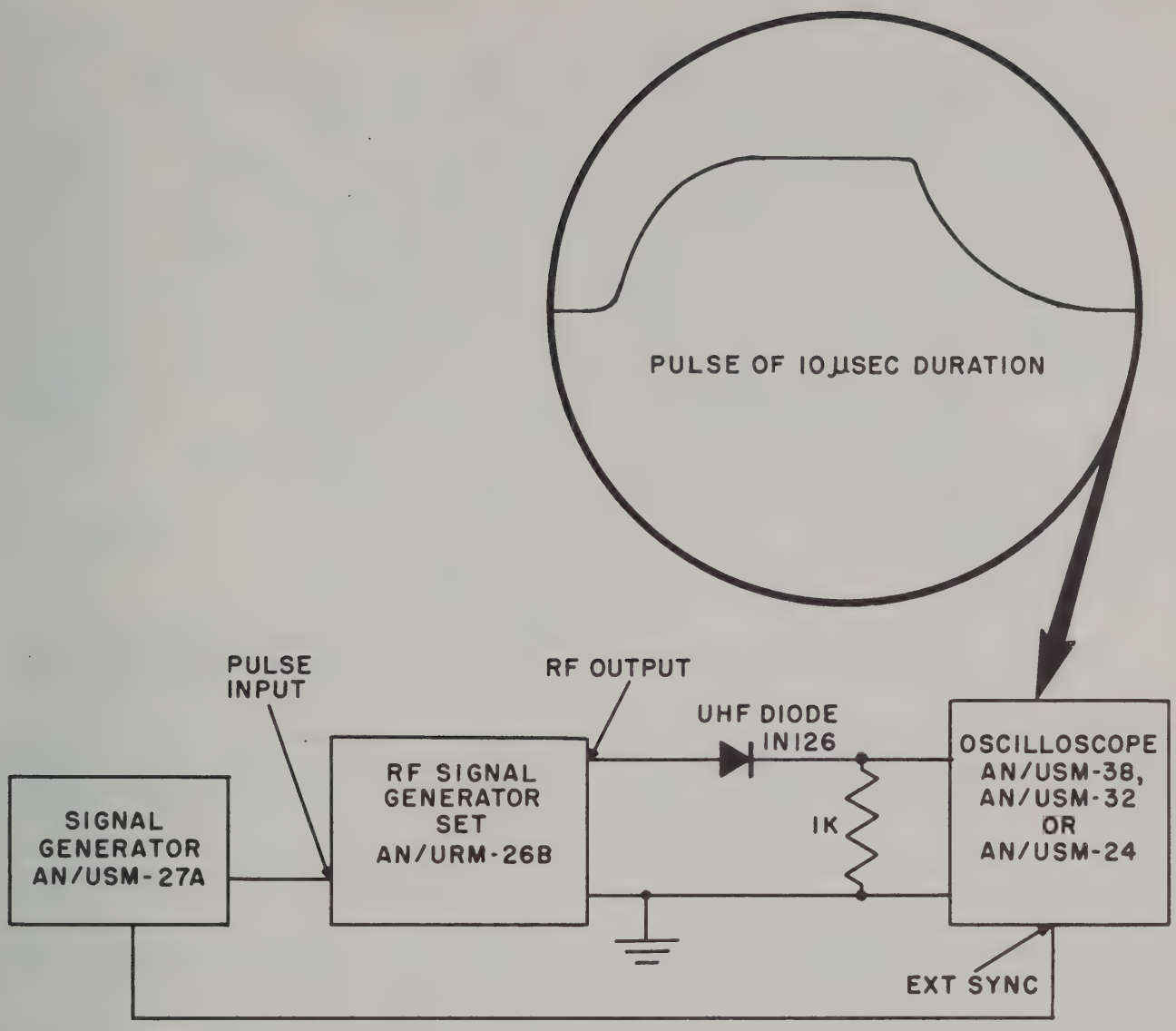


Figure 4-6. Oscilloscope Hookup to Observe Pulse Waveform.

put is pulsed-CW of the general wave-form shown in figure 4-6.

b. PULSE LIMITER. – To prevent overloading the rf oscillator with input pulses of high amplitude, Pulse Limiter V104 has positive 210 volts applied to its cathode, with its plate exposed to the incoming pulse. Pulse inputs of 40 volts or more are stepped up by pulse transformer T102 to a value suitable for plate voltage for rf oscillator V103. If the pulse input voltage is excessive (of such a value as to place the plate of pulse limiter V104 above 210 volts) the pulse limiter diode V104 will conduct, lowering the resistance of the limiter tube, flattening the peaks of the input pulse at the 210 volt level. This clipping action protects the rf oscillator from overloading.

4-4. INTERNAL MODULATION CIRCUIT.

An internal source of modulation voltage is provided by a built-in audio oscillator. The audio oscillator and modulator are described in detail below.

a. AUDIO OSCILLATOR. – The audio oscillator is mounted on a sub-chassis on the left side of the signal generator (when viewed from the back) and is a standard Wien-bridge oscillator using a type 5814A dual-triode (V101). The oscillator generates an audio signal of either 400 or 1000 cycles per second, depending upon the position of MOD and METER SELECTOR switch S101. When S101C is in the EXT, CW or PULSE position (see figure 4-7) the audio oscillator grid is grounded, cutting off the oscillator.

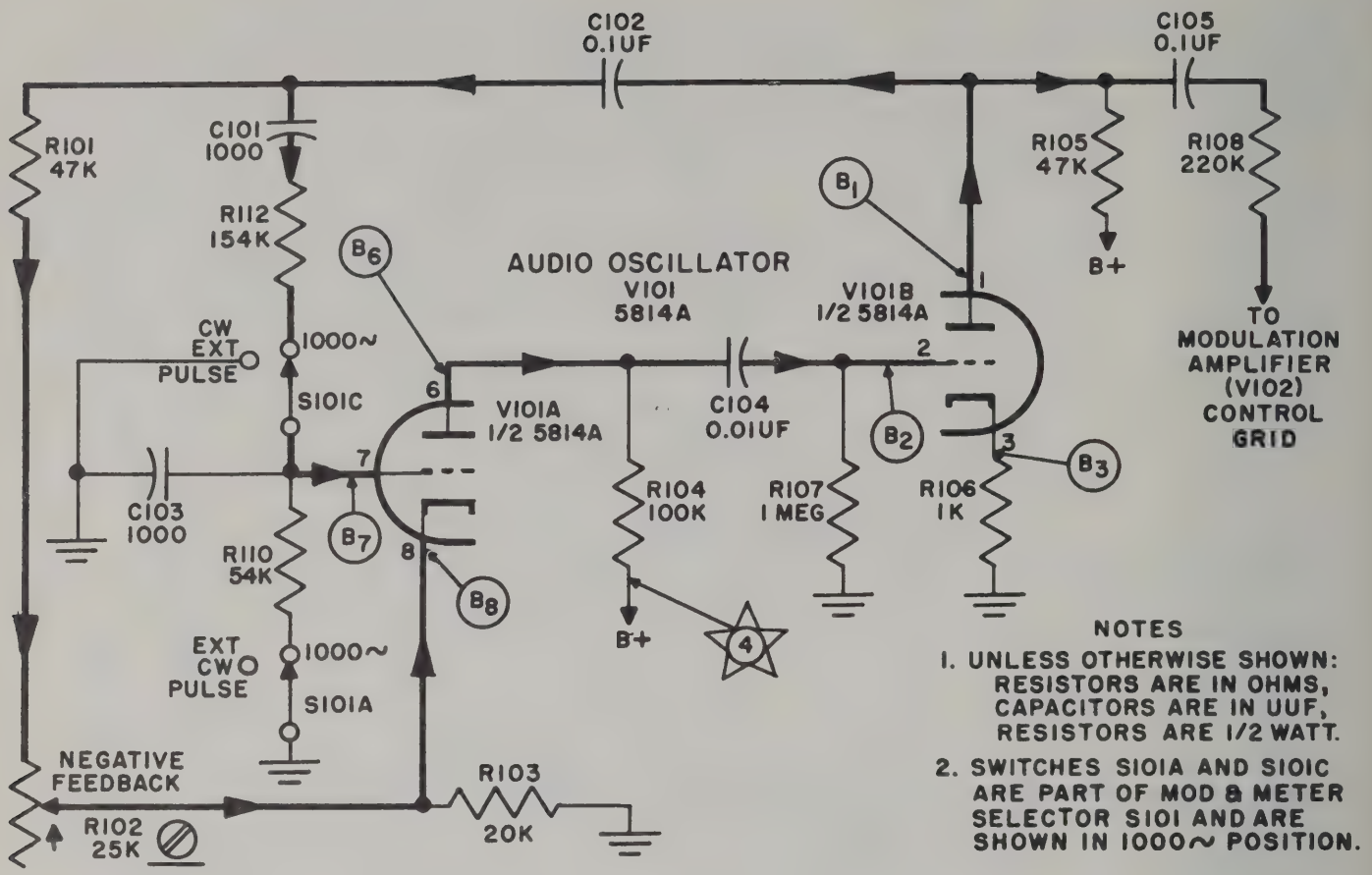


Figure 4-7. Simplified Schematic Diagram of the Audio Oscillator Set for 1000 Cycle Operation.

An external modulating voltage may then be applied to the EXT MOD PULSE INPUT jack J103 on the front panel. Figure 4-7 is a simplified schematic diagram of the audio oscillator when set for 1000 cycles. For purposes of clarity, the mechanics of the MOD and METER SELECTOR switch S101 have been omitted. When S101 is switched to 400 cycle operation, resistors R112 and R110 are replaced with other values as required for the other frequency. The stage shown in figure 4-7 shows the dual-triode tube as two separate triodes, with V101A as the oscillator section and V101B as the inverter-amplifier section of the stage. Signal developed in V101A leaves the plate, proceeds through C104 to V101B. Here it is amplified and inverted, leaving its plate and is fed back through C102, C101 and R112 to the input of V101A *in phase* with the originating signal at the grid of V101A. The *positive feedback* voltage thus fed back to the grid of V101A reinforces the initial signal, sustaining oscillations. The frequency-determining elements are C101, R112, C103, and R110, whose time constants determine oscillator frequency.

An alternate signal path from plate of V101B through C102, R101 and audio feedback control R102 supplies degenerative feedback to the cathode. The Wien bridge circuitry provides that the voltage across R103 is in phase with the output voltage from V101B, with positive feedback (at grid of V101A) exceeding the negative feedback (at cathode of V101A). The balance of the bridge is controlled by R102, controlling the phase-shift of the negative feed-back voltage. Degenerative or negative feedback is provided by the voltage-divider network consisting of R101, R102 and R103. Capacitor C102 is a dc blocking capacitor, as is C104. Resistors R104 and R105 are the plate load resistors for the two triodes. Resistor R107 is the grid return for the inverter-amplifier stage, and R106 is its cathode return. The reinforced oscillations of V101A are amplified by V101B and pass through network C105 and R108 to the modulation amplifier (V102) control grid, supplying the desired modulation frequency. (A more complete discussion of the principles of the Wien-bridge oscillator may be found in Radar Electronic Fundamentals, NAVSHIPS 900,016).

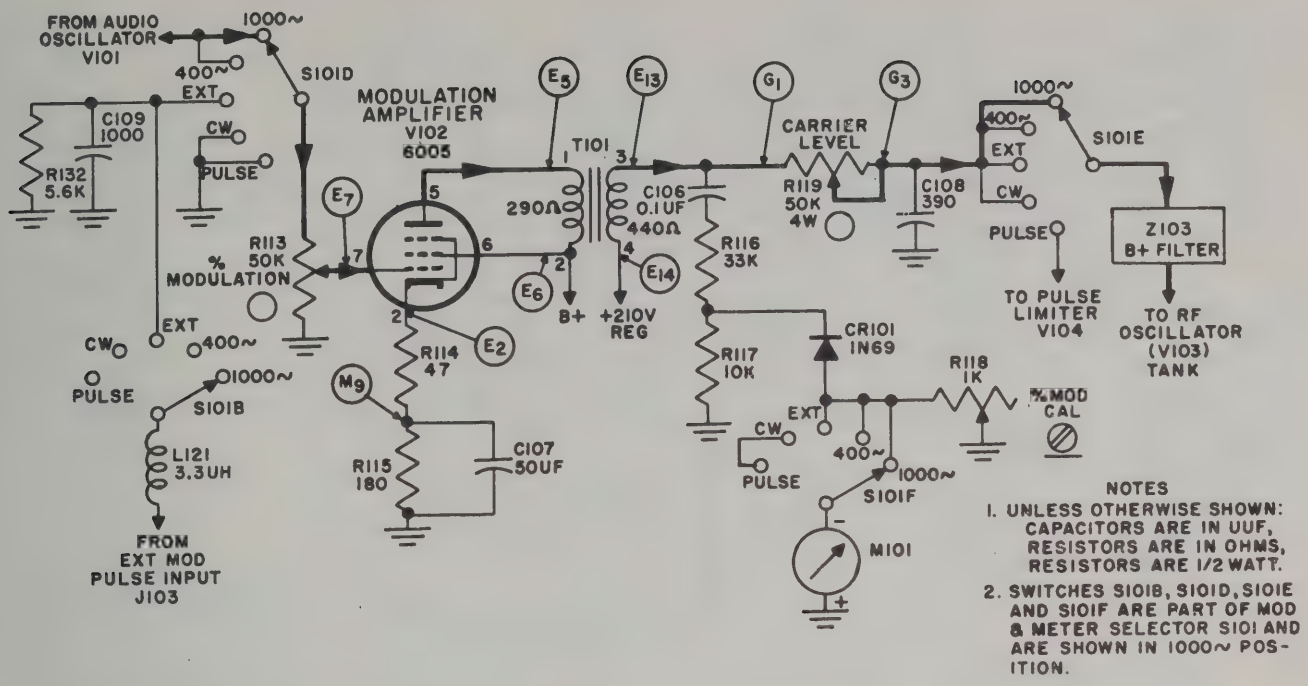


Figure 4-8. Simplified Schematic Diagram of the Modulation Amplifier and % Modulation Meter Circuit.

b. MODULATOR. – (See figure 4-8.) The input to modulator V102 is selected by switch S101D. In the 400 or 1000 cycle position, the input to modulator V102 comes from the output of audio oscillator. In the EXT position, switches S101B and S101D permit an external signal via J103, through rf choke L121, stabilized by C109 and R132 to V102. When S101D is switched to CW or PULSE position, the modulation amplifier is shorted to ground. In other than the CW or PULSE position, the modulator provides a measurable degree of sine wave plate modulation to the rf oscillator V103 (see figure 4-8) by amplifying signal fed to the modulation amplifier input grid. The signal is then amplified by V102, passing through modulation transformer T101, through CARRIER LEVEL control R119, through S101E and Z103 to the rf oscillator coil tank. Resistors R114 and R115 provide cathode bias. Resistor R115 is by-passed by C107 to smooth out the cathode bias, but R114 (a smaller resistor) is left unbypassed to introduce enough degeneration to decrease distortion in the stage. The CARRIER LEVEL control R119 is a front panel control for setting M101 to the red line on the meter. Capacitor C108 functions to by-pass any rf in the modulation line.

c. % MODULATION CIRCUIT. – Since the plate voltage of the RF Oscillator V103 (see figure 4-8) is supplied through modulation transformer T101 at a regulated 210 volts, the percentage of modulation is directly proportional to the amount of modulating voltage introduced and is independent of the actual carrier voltage. This is explained by the fact that 100% modulation is introduced when the modulating voltage swings the instantaneous plate potential from zero to twice the dc plate voltage. Smaller modulating voltages therefore result in lower degrees of modulation. The desired percentage of modulation is selected by means of % MODULATION potentiometer R113 (see figure 4-8) and is read directly from meter M101. The modulating voltage is applied to V102 across R113. A part of the modulating voltage is taken off C106 blocking capacitor and voltage divider R116 and R117, rectified by CR101 and read by M101 when MOD and METER SELECTOR switch is in the 400~, 1000~ or EXT position. Adjustment R119 sets the meter sensitivity by internal screwdriver adjustment when calibrating M101 for percent modulation.

4-5. EXTERNAL MODULATION CIRCUIT.

(See figure 4-9)

If the built-in 400 cycle or 1000 cycle sine wave generator is not desired for modulating the rf output, then any external sine wave generator supplying frequencies up to 20,000 cycles (approximately 2 to 10 v r.m.s.) may be used, feeding the external modulation source into the EXT MOD PULSE INPUT jack J103 on the front panel, with the MOD and METER SELECTOR in EXT position. The signal entering J103 goes via rf choke L121 through switch S101B and S101D to the grid of modulation amplifier V102. The modulation signal is amplified by V102, continuing through modulation transformer T101 and CARRIER LEVEL control R119 through S101E and Z103 (B+ filter) to the tank circuit oscillator coil of rf oscillator V103, and thus modulating the rf output in the same manner as that performed by the internal modulating frequencies. Note that switch S101C shorts

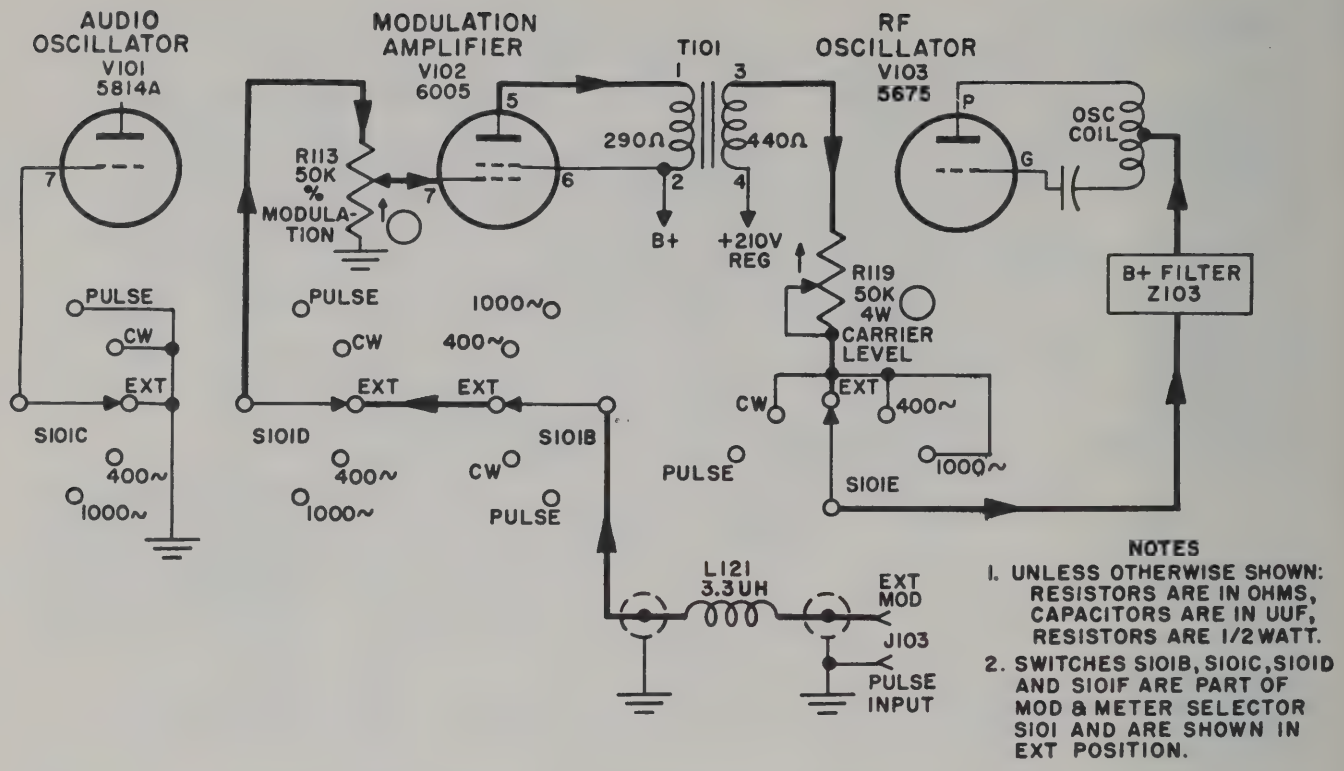


Figure 4-9. Simplified Schematic Diagram showing External Modulation.

out the grid of Audio Oscillator V101 when in the EXT position, making the local audio oscillator inoperative when an external modulating frequency is used.

4-6. TERMINATING THE SIGNAL GENERATOR.

Signal Generator SG-117/URM-26B has a characteristic output impedance of approximately 50 ohms (resistor R130) (see figure 4-4.). The microvolts input to a receiver under test will be accurate only when the signal generator is terminated in approximately 50 ohms resistive at the receiver end of the test cable. This voltage under terminated conditions is read directly on the MICROVOLTS scale of the RF OUTPUT dial. Two RF Cords 7″ long and two RF Cords 4′-1″ long are provided for making the necessary output connections (see figure 1-1). All four cables are identical except for length and consist of RG-58C/U cables with one type UG-88/U connector at each end. The characteristic impedance of these cables is approximately 50 ohms and there will be no standing wave losses between the signal generator and receiver if the receiver end is terminated in approximately 50 ohms. Most modern Navy receivers present a resistive input impedance of 50 ohms. This is especially true for receivers covering frequency ranges above 50 mc. In these cases, the output of the generator at the RF OUTPUT jack J101, can be connected direct to the receiver input. The microvolt reading determined from the RF OUTPUT dial will accurately represent the input voltage to the receiver under test. Where attenuation of the output is desired, or where the receiver input impedance is different from that of the signal generator output, it is necessary to use special terminating circuits. These are discussed in paragraphs 3-9, 3-10, 3-11, and 3-12.

4-7. POWER SUPPLY PP-1215/URM-26B.

(See figure 4-10 and 6-16.)

Power Supply PP-1215/URM-26B is an integral part of the RF Signal Generator Set AN/URM-26B and is completely contained in a separate sub-chassis located to the rear of Signal Generator SG-117/URM-26B. It employs a full-wave type rectifier tube type 6X4WA, conventional power transformer, with output filtered to minimize ripple content. Both input (115 v ac ±10%, single phase, 50 to 1000 cycles) and outputs, unregulated high voltage at 180 volts for the operation of non-critical circuits of the signal generator, plus 210 volts regulated to the rf oscillator and other critical circuits, and 6.3 volts ac for the heaters of all electron tubes, are brought to receptacle J201 mounted on the power supply chassis. Power supply jack J201 mates with plug P101 on the signal generator unit.

a. When plug P102 at the front panel is connected to a 115 v ac source, the input voltage is delivered

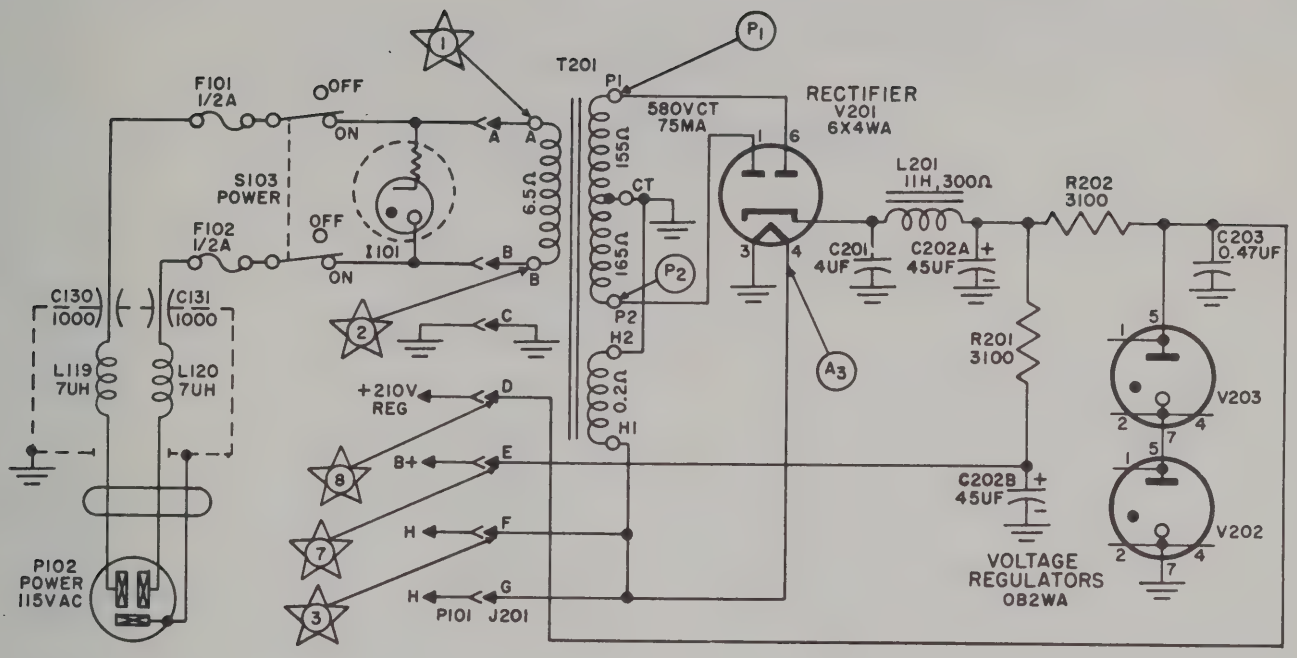


Figure 4-10. Schematic Diagram of Power Supply PP-1215/URM-26B.

to the power supply via rf filters L119, L120, C130 and C131 (see figures 4-10 and 5-1.), and through fuses F101 and F102. Power switch S103 on the front panel switches power for the whole signal generator set, lighting panel lamp I101 when switch is placed in ON position. Power transformer T201 provides a 6.3 v filament winding for all filaments, including rectifier V201. Centertap of the high-voltage winding is grounded in the conventional manner. The rectified output of V201 is filtered by filter capacitors C201 and C202A and filter choke L201. At the output of the filter network the dc path divides, part passing through R201 voltage-dropping resistor for unregulated output B+ with additional filtering by C202B, and part passing through voltage-dropping resistor R202, with additional filtering by C203, to provide regulated +210 volts.

b. The voltage regulators OB2WA have a nominal voltage rating of 105 volts, so two regulators are required for the 210 volt regulated output. The voltage across V203 and V202 remains constant over a fairly wide range of current (5 to 30 ma) passing through the tube. This property exists because the degree of ionization of the gas in the tubes varies with the amount of current through the tube. When a large current is passed, the gas is highly ionized and the internal impedance of the tube is low. When a small current is passed, the gas is ionized to a lesser degree and the internal impedance is high. Over the operating range of the tube, the product of the current through the tubes and the internal impedance of the tubes is practically constant. If the supply voltage (output of R202) drops, the voltage across V202-V203 would tend to drop. However, the gas in the glow tubes deionizes slightly and less current passes through the tube. The current through the series dc dropping resistor R202 is also decreased by the amount of this current decrease in the glow tubes. This would develop sufficiently smaller voltage drops across the R202 to maintain the required stable 210 volts drop across the glow tubes. A rise in supply voltage is similarly compensated.

c. The regulator tubes also provide a stable output voltage when the load impedance varies. If the load increased, more current would flow through the dropping resistor R202. This would tend to drop the 210 v DC output voltage across the regulator tubes. However, this voltage drop tendency slightly deionizes the regulator tubes, resulting in an increase in its internal impedance. This increase in glow tube impedance, relative to the DC impedance of the series dropping resistor, again raises the power unit output voltage to the required 210 v DC.

SECTION 5

TROUBLE-SHOOTING

5-1. GENERAL.

a. The first step in trouble-shooting RF Signal Generator Set AN/URM-26B is to determine that a trouble actually exists. If the equipment is not operated correctly, certain indications of trouble might be present when there is actually nothing wrong with the equipment. The technician should be thoroughly familiar with Section 3, Operator's Section before attempting to analyze the indicated defect.

b. After a positive determination is made that the signal generator is defective, the next step is to *sectionalize* the fault. Sectionalization means tracing the fault to the *major component* (such as the power supply unit) or *circuit* (such as the internal audio modulating circuit) responsible for the abnormal condition. The next step is to localize the fault. Localization means tracing the fault to the defective *part* responsible for the abnormal operation.

c. A preliminary check shall be made before proceeding with any trouble-shooting procedure. Visual inspection shall come before any actual instrument servicing. The first check shall include such items as indicator lamps, position of power switches, fuses, loose cables, charred insulation, broken wires, control settings, physical damage and everything that can be observed with the senses and the fingertips. The subject of fuses is covered in paragraph 5-2*b*. The Routine Check Chart covered in paragraph 5-3 checks routine performance. Where trouble-shooting with instruments is indicated, use recommended instruments listed in paragraph 5-4

d. The funtional section trouble-shooting charts following make up quickaction charts which show normal indications of operating sections. Where you find a section whose indication is not normal, you have isolated the particular section (and possibly the part) at fault. You will be referred to the proper paragraph for repair procedures. Where it is necessary to disassemble a section to get to the test points, you will be referred to the necessary disassembly paragraph.

5-2. PERIODIC TESTING.

a. ROUTINE MAINTENANCE CHECK CHART. – The construction of Signal Generator Set AN/URM-26B is such that preventive maintenance measures are limited. Periodic testing of the equipment to determine if it is in proper working order should be performed in accordance with the step-by-step procedure given in Table 5-1, ROUTINE CHECK CHART. If the signal generator is used frequently (several times a week), these checks should be made before use; otherwise they should be made weekly. All symbol designations given in Table 5-1 refer to Front Panel Diagram, figure 6-1, unless specified otherwise.

Note

THE ATTENTION OF MAINTENANCE PERSONNEL IS INVITED TO THE REQUIREMENTS OF CHAPTER 67 OF THE BUREAU OF SHIPS MANUAL OF THE LATEST ISSUE.

b. FUSE FAILURE. – Symptoms of fuse failure and fuse locations are given in Tables 5-2 and 5-3. Spare fuses are provided in clips in the case cover.

CAUTION

Never replace a fuse with one of higher rating unless continued operation of the equipment is more important then probable damage. If a fuse burns out immediately after replacement, do not replace it a second time until the cause has been corrected.

c. LUBRICATION. – All gears and moving shafts should be lubricated periodically with Aero Lubriplate manufactured by Fisk Brothers, Newark, New Jersey.

5-3. PERFORMANCE STANDARDS.

Table 5-1 provides a routine check chart for operator to check performance. The first column shows what is being checked, the second column provides instructions on how to check, while the third column indicates normal performances and precautions.

TABLE 5-1. ROUTINE CHECK CHART.

WHAT TO CHECK	HOW TO CHECK	PRECAUTIONS AND REMARKS
1. INSTALLATION	Before connecting signal generator power plug P102 to an ac source, make sure the equipment is properly set up in accordance with instructions given in Section 3. *a.* POWER switch (S103) in OFF position. *b.* CARRIER LEVEL control (R119) fully counterclockwise. *c.* % MODULATION control (R113) fully counterclockwise. *d.* RF OUTPUT attenuation control (AT101) fully counterclockwise.	See that all cables and wires are in good condition and that connections are properly made.
2. POWER SUPPLY	Set controls as follows: *a.* CARRIER LEVEL control (R119) fully counterclockwise. *b.* % MODULATION (R113) fully counterclockwise. *c.* Connect power plug P102 to a source of 115 volts, 50 to 1000 cps power.	The indicator lamp I101, POWER, should light. If not, check the front panel fuses (see Table 5-3) and indicator lamp. (Note: I101 is a neon glow type lamp and it can be checked only by applying 115 v ac.).
3. International Modulation and Modulation Metering check	*a.* Turn the MOD and METER SELECTOR switch (S101) to 400 cycle position. *b.* Advance the % MODULATION control (R113) and at the same time watch the panel meter. The meter pointer should rise smoothly to full scale. *c.* Repeat for 1000 cycle position.	This test checks out the % MODULATION control (R113), the basic meter (M101), and the internal sine wave modulating circuits.
4. CARRIER LEVEL check	*a.* Turn the % MODULATION control completely counterclockwise. *b.* Turn the MOD and METER SELECTOR switch (S101) to CW position. *c.* Rotate the CARRIER LEVEL control (R119) clockwise while simultaneously observing the panel meter (M101). The meter pointer should advance smoothly to the red line on the upper scale. *d.* Repeat check for all six detented frequency band positions. *e.* Check for smooth mechanical operation and positive detent action. See that the dial mask locates properly.	This operation checks the capability of the rf oscillator on each band, and the rf level metering circuit.
5. FREQUENCY DIAL	Rotate the TUNING knob clockwise until the MEGACYCLES dial turns to its extreme position; then rotate it counterclockwise to the opposite extreme position. Check that the mechanical action is smooth and that no binding or slipping occurs. See that full dial coverage is obtained.	This is a mechanical check only.
6. RF OUTPUT Attenuator Dial	Rotate the RF OUTPUT dial from one extreme to the other. The mechanical action of this control is firm but smooth; there should be no roughness or binding at any point.	This is a mechanical check only.

TABLE 5-2. SYMPTOMS OF FUSE FAILURES.

INDICATOR LAMP	ALL ELECTRON TUBES	METER M101	OPEN FUSE	VALUE (AMPS)	COMMENTS
Not Lighted	Filaments off	No reading	F101	½	Check also power supply cables, connectors, and the POWER switch S103.
Not Lighted	Filaments off	No reading	F102	½	

TABLE 5-3. FUSE LOCATIONS.

SYMBOLS	LOCATIONS	PROTECTS	AMPS	VOLTS
F101 F102	1. Physically located in fuse-holders on the front panel of the signal generator (see figure 6-1.) 2. Electrically located in the primary of power transformer T201. See figure 4-10.	Primary of power transformer T201.	½	250
F103 F104	Physically located on ferrule clips in the case cover.	Spares for F101 and F102	½	250

5-4. TEST EQUIPMENT REQUIRED FOR MAKING REPAIRS AND TROUBLE-SHOOTING.

The technician may find a wide variation of applicable test equipment to use in making repairs or for trouble-shooting on RF Signal Generator Set AN/URM-26B. To achieve the best results, however, the test equipment listed below, or its equipalent, are recommended.

a. Multimeter AN/PSM-4 (multimeter with dc sensitivity of 20,000 ohms/volt, ac sensitivity of 1000 ohms/volt).

b. Multimeter AN/USM-34.

c. Oscilloscope AN/USM-38, AN/USM-32 or AN/USM-24 (Synchroscope).

d. Navy Model LM series, AN/USM-29 or AN/URM-82 Frequency Meter (125 kc to 20 mc).

e. Another Signal Generator Set AN/URM-26B of known good accuracy, or equivalent crystal-controlled calibration standard, with frequency range from 4 to 400 mc.

5-5. FUNCTIONAL SECTION TROUBLE-SHOOTING AND REPAIR.

Each functional section of the signal generator is separated in the trouble-shooting techniques below:

a. POWER SUPPLY PP-1215/URM-26B. – Remove power supply in accordance with paragraph 6-3*b*. Using Table 5-4 as guide, follow the steps in order, checking the necessary test points with Multimeter AN/PSM-4 (or any equivalent multimeter with dc sensitivity of 20,000 ohms per volt and ac sensitivity of 1000 ohms per volt). See figure 4-10 for the schematic diagram and figure 5-1 for the test point diagram. Take the preliminary action indicated in the third column of table 5-4 and see the normal indication in the next column. The last column directs you to the next step. All tests on the power supply are made with the one multimeter, with the signal generator set plugged in and turned on.

b. AUDIO OSCILLATOR. – Expose the audio oscillator section (see paragraph 6-9). Set the signal generator operating in 1000 cycle position. Using Table 5-5 as guide, follow the steps in order, connecting Multimeter AN/USM-34 (or any equivalent vacuum-tube-voltmeter) to the proper test points, taking the preliminary action indicated in the third column of the table, then see the normal indication in the next column. The last coumn directs you to the next step. Fig.5-2 is the test point diagram, and figure 5-3 is the wiring diagram. Figure 4-7 is the partial schematic diagram.

c. MODULATOR. – Note figure 5-2 showing test points of modulator, with figure 5-3 showing wiring diagram. Use Table 5-6 as guide, follow the steps in order, connecting Multimeter AN/USM-34 (or any equivalent vacuum-tube-voltmeter) to the proper test points, taking the preliminary action indicated in the third column of the table, then see the normal indication in the next column. The last column directs you to the next step.

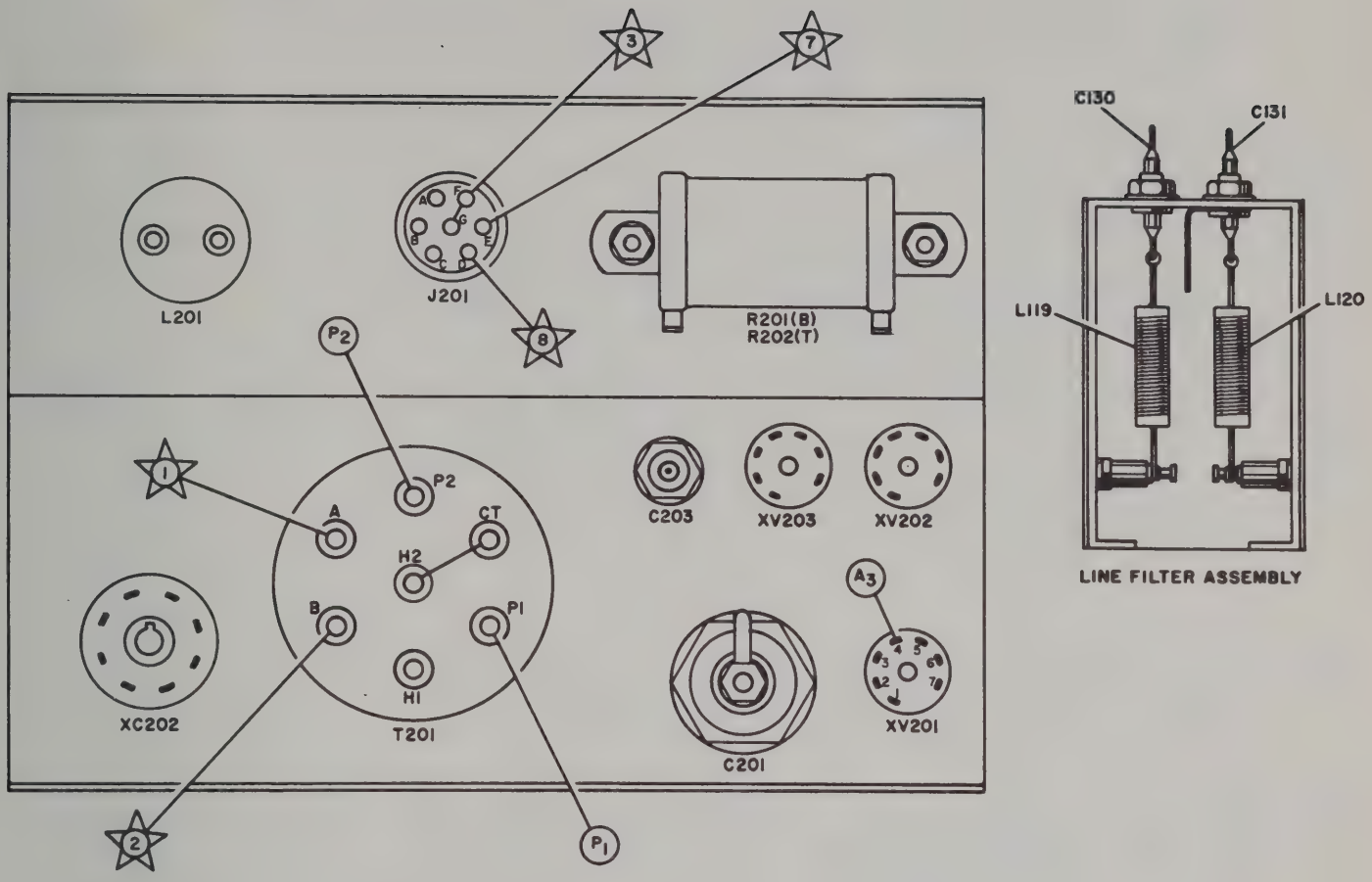


Figure 5-1. Power Supply PP-1215/URM-26B with Chassis Folded Flat and Line Filter Assembly.

d. PULSE MODULATOR. – Expose the pulse limiting stage (see paragraph 6-9), so that the test points are available as in figure 5-2. Figure 4-5 shows the simplified schematic diagram. Figure 4-6 shows the oscilloscope hookup to observe pulse waveform. Figure 5-3 shows the wiring diagram of this stage. Figure 5-4 shows the audio and metering section terminal board. Figure 5-5 shows the modulation and pulse transformers. Using Table 5-7 as guide, follow the steps in order, connecting the appropriate test instruments as follows (see figure 4-6). Turn on signal generator, set for 100 mc, CW. Set CARRIER LEVEL so meter reads to red line. Switch to PULSE. Turn on the pulse generator (Signal Generator AN/USM-27A) to 10 Usec pulse length, +PULSE, 40 PULSE VOLTS, PULSE REP RATE KC to 0.1, connecting PULSE OUT to PULSE INPUT J103 of signal generator. Connect SYNC OUT of pulse generator to EXT SYNC terminal of Oscilloscope AN/USM-32, 24 or 38. Connect RF OUTPUT J101 of signal generator through 1N126 UHF Diode to the V. INPUT of the oscilloscope. The SYNC VOLTS control of the pulse generator will adjust the trace to synchronization with the switch in + SYNC position on the pulse generator. Set the oscilloscope horizontal sweep to 100 cps. Take the preliminary action indicated in the third column of Table 5-7, then see the normal indication in the next column. That last column directs you to the next step.

e. RF OSCILLATOR. – Expose the rf oscillator stage (see paragraph 6-5) so that the test points are exposed as in figure 5-6. Figure 5-7 shows the metering crystal pickup mount. Figure 4-2 shows the simplified schematic diagram for this stage. Using Table 5-8 as guide, follow the steps in order, connecting the appropriate test instruments to the proper test points. Take the preliminary action indicated in the third column of the table, then see the normal indication in the next column. The last column directs you to the next step.

TABLE 5-4. POWER SUPPLY PP-1215/URM-26B, FUNCTIONAL SECTION TROUBLE-SHOOTING CHART

(See figures 4-10, 5-1 and 5-2.)

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
	(All test points taken from figure 5-1).	(All voltage tests made with power supply connected to signal generator, with equipment on and operating.)	(All indication will be visible on Multimeter AN/PSM-4. Switch appropriate ranges as required.)	
1	① and ②	On ac scale, connect probes of multimeter between test points 1 and 2.	115 volts (same voltage as is provided by the source supply.) Pilot light I101 will be ON. This measures voltage at the primary of power transformer.	If indication is normal, proceed to next step. If not normal, make a note that power is not reaching primary of power transformer.
2	③	On ac scale, connect black probe to chassis, red probe to test point.	6.3 volts (filament). This measures voltage across filament winding.	If indication is normal, proceed to next step. If step 1 is normal, but this step is not, an open circuit in the power transformer is indicated. Confirm by reading voltage between test point 3 and terminal H2.
3	A_3	On ac scale, connect black probe to chassis, red probe to test point.	6.3 volts (filament). This measures filament voltage at filament of V201 tube.	If indication is normal, proceed to next step. If step 2 is normal, but this step is not, check continuity of wiring from test point 3 to test point A3.
4	P_1 and P_2	This test point need be checked only if next two test points do not give normal indication. On ac scale, connect test probes to point P_1 and P_2.	550 to 580 volts. This measures plate winding of power transformer, end to end.	If indication is not normal, but all preceding steps are normal, there may be a fault in the plate winding of the power transformer, or short in rectifier tube V201 or its associated circuit.
5	⑦	On dc scale, connect black probe to chassis, positive probe to test point.	180 volts. This measures the unregulated dc output of the power supply.	If indication is normal, proceed to next step. If abnormal, but all preceding steps were normal, there may be failure in the filter system or dropping resistors.
6	⑧	On dc scale, connect black probe to chassis, positive probe to test point.	210 volts. This measures the regulated output of the power supply.	If indication of this step and all previous steps are normal, the power supply shall be considered in normal operating condition. If all previous steps are normal, but this step is abnormal, then failure may be due to R202, C203, V202 and V203.

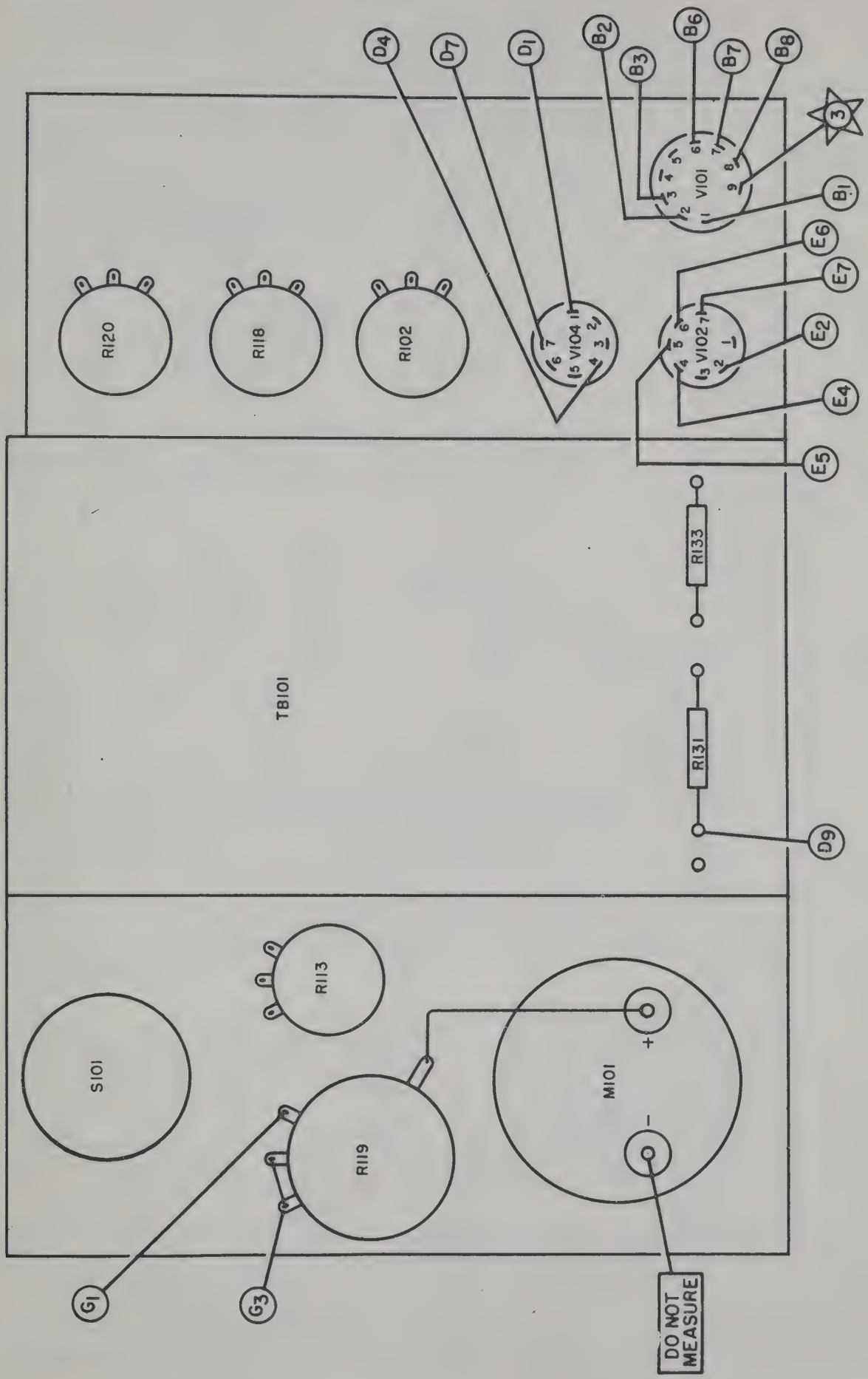


Figure 5-2. Test Points; Audio Oscillator, Modulator and Pulse Circuits with Chassis Folded Back.

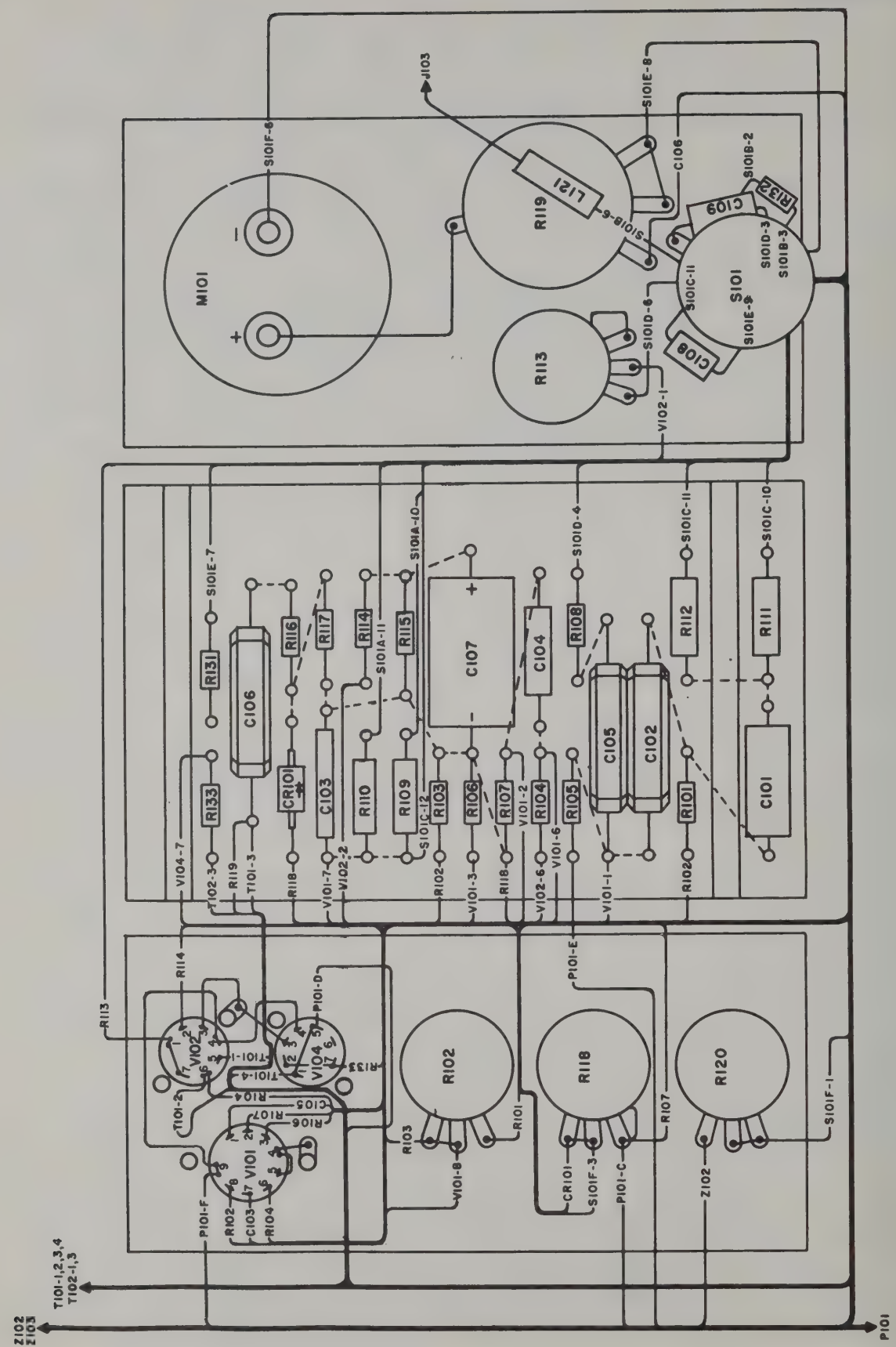


Figure 5-3. Wiring Diagram; Audio Oscillator, Modulator and Pulse Circuits, with Chassis Folded Back.

TABLE 5-5. AUDIO OSCILLATOR SECTION, FUNCTIONAL SECTION TROUBLE-SHOOTING CHART

(See figures 4-7, 5-2, 5-3 and 5-4.)

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
	(All test points taken from figure 5-2, except as otherwise noted.)	(All voltage test made with signal generator operating in 1000 cycle position, with % MODULATION control in maximum counter-clockwise position.)	(All indication will be shown on Multimeter AN/USM-34 appropriate range.)	
1	③	On ac scale, connect black probe to chassis, red probe to test point.	6.3 volts (filament). This measures voltage across filament of V101.	If indication is normal, proceed to next step. If abnormal, trace wiring and take reading at test point ○E4 and ○D4, all of which reads 6.3 volts.
2	B_1	On dc scale, connect black probe to chassis, positive probe to set point.	+100 volts (plate of V101 at pin 1).	If indication is normal, proceed to next step. If abnormal, remove V101 and test again. Voltage should double with tube out of socket.
3	④ (Fig.5-4)	On dc scale, connect black probe to chassis, positive probe to test point.	+180 volts (unregulated voltage supply).	If indication is normal proceed to next step. If abnormal, check output of regulator tube at power supply, step 8, Table 5-4. If this step is normal, but step (2) above is abnormal, check voltage at each end of R105 to localize failure. Terminal 4 is high end of R105. Terminal M7 is low end of R105.
4	B_6	On dc scale, connect black probe to chassis, positive probe to test point.	+157 volts (plate of V101 at pin 6).	If indication is normal proceed to next step. If abnormal, check test point with V101 out of socket. Reading should increase 50 volts. If step (3) is normal, but step (4) is abnormal, check voltage at each end of R104 to localize failure. See figure 5-4. Terminal 4 is high end of R104. Terminal M8 is low end of R104.
5	B_8	On dc scale, connect black probe to chassis, positive probe to test point.	10 volts (cathode voltage, pin 8, V101).	If indication is normal proceed to next step. If abnormal, note incorrect voltage at pin 8, V101, possibly incorrect setting of audio feed back control R102.
6	B_3	On dc scale, connect black probe to chassis, positive probe test point.	2 volts (cathode voltage, pin 3, V101).	If indication is normal, proceed to next step. If abnormal, note incorrect voltage at pin 3, V101.
7	B_7	On dc scale, connect black probe to chassis, positive probe to test point.	ZERO volts (grid voltage, pin 7, V101).	If indication is normal, proceed to next step. If abnormal, check C103, R110.
8	B_2	On MINUS DC scale, connect black probe to chassis, positive probe to test point.	−2 volts (grid voltage, pin 2, V101).	If indication is normal, proceed to next step. If abnormal, check R107, C104.
9	E_7 (Fig.5-2 and 6-7)	Replace Multimetor AN/USM-34 with Oscilloscope AN/USM-32, 38, 24. Connect the V. INPUT probe of oscilloscope to test point.	Pure sine wave. Adjust R102 until sine wave is distorted by over driving and clipping. Then back up the control to true sine wave.	This is a normal adjustment procedure, the last step of audio oscillator section checking, indicating normal performance of entire stage.

TABLE 5-6. MODULATOR SECTION, FUNCTIONAL SECTION TROUBLE-SHOOTING CHART
(See figures 4-8, 5-2, 5-3 and 5-4.)

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
	(All test points taken from figure 5-2 except as otherwise noted.)	(Turn on signal generator; set for 5 mc, CW. Set CARRIER LEVEL so meter reads to red line. Switch to 1000 cycles. Adjust % MODULATION to 30%.)	(All indication will be shown on Multimeter AN/USM-34. on appropriate range.)	
1	E_4	On ac scale, connect black probe to chassis, red probe to test point.	6.3 volts (filament). This measures voltage across filament of V102.	If indication is normal, proceed to next step. If abnormal, trace wiring and take reading at test point ○ E4 and ○ D4, all of which reads 6.3 volts.
2	E_5	On dc scale, connect black probe to chassis, positive probe to test point.	180 volts. This is the voltage at plate pin 5 of V102.	If indication is normal, proceed to next step. If abnormal, check voltage at terminal 1 of T101 (figure 5-5). Both points should read 180 volts.
3	E_6	On dc scale, connect black probe to chassis, positive probe to test point.	180 volts. This is the voltage at screen pin 6 of V102.	If indication is normal, proceed to next step. If abnormal, check voltage at terminal 2 of T101 (figure 5-5). Both points should read 180 volts.
4	E_2	On dc scale, connect black probe to chassis, positive probe to test point.	8 volt. This is the voltage at cathode pin 2 of V102.	If indication is normal, proceed to next step. If abnormal, check R114, R115 and C107.
5	M_9 (figure 5-4.)	On dc scale, connect black probe to chassis, positive probe to test point.	6.5 volts. This is the tie point between R114 and R115.	If indication is normal, proceed to next step. If abnormal, check R114, R115 and C107.
6	E_7	On ac scale, connect black probe to chassis, positive probe to test point.	3 volts ac. This is the voltage at grid pin 7 of V102.	If indication is normal, proceed to next step. If all preceding steps are normal, but step 6 is abnormal, check Audio Oscillator, Table 5-5, since that stage must operate normally for proper reading of this step.
7	E_7	Same conditions as step (6) above. Vary % MODULATION control on front panel. (Return control to 30% position after completing this step.)	Voltage indication at test point varies smoothly with variation of control.	If indication is normal, proceed to next step. If abnormal, check R113 (Figure 5-2).
8	G_1 and G_3 (figure 5-2.)	On ac scale, connect probes to test point. Vary CARRIER LEVEL control on front panel.	0 - 142 volts, varying smoothly with variation of control.	If indication is normal, proceed to next step. If abnormal, check R119.
9	E_5 (figure 5-5.)	On dc scale, connect black probe to chassis, positive probe to test point.	180 volts. This is voltage at terminal 1 of T101.	If indication is normal, proceed to next step. If abnormal, check test point ○ E5 figure 5-2, direct connection to this point.

TABLE 5-6 (Continued)

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
10	(E6) (figure 5-5.)	On dc scale, connect black probe to chassis, positive probe to test point.	180 volts. This is voltage at terminal 2 of T101.	If indication is normal, proceed to next step. If abnormal, check test point ○E6 figure 5-2, direct connection to this point.
11	(E13) (figure 5-5.)	On dc scale, connect black probe to chassis, positive probe to test point.	210 volts. This is voltage at terminal 3 of T101.	If indication is normal, proceed to next step. If abnormal, check test point ○G3 figure 5-2, direct connection to this point.
12	(E14) (figure 5-5.)	On dc scale, connect black probe to chassis, positive probe to test point.	210 volts. This is voltage at terminal 4 of T101.	If indication is normal, but step (11) is abnormal, fault may be in secondary winding of T101 or *loading* beyond terminal 3 of T101.

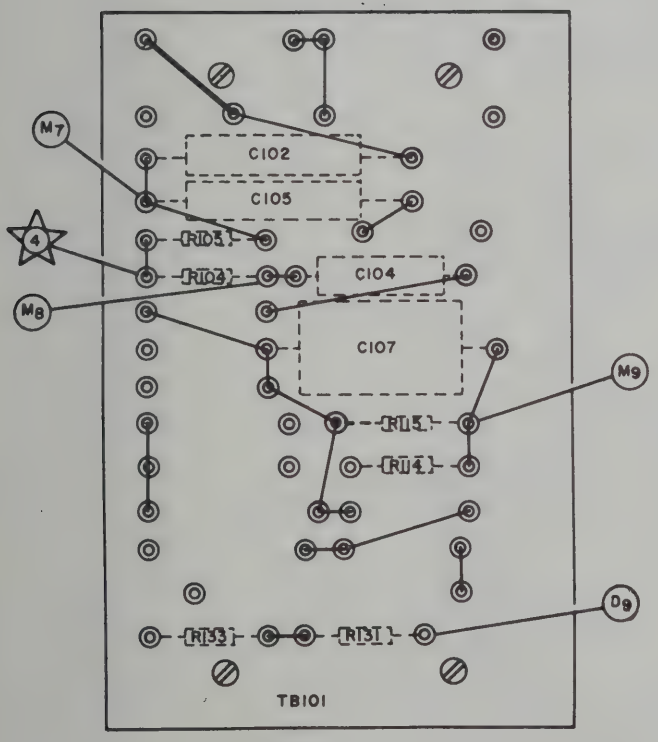


Figure 5-4. Audio and Metering Section Terminal Board, Outside View.

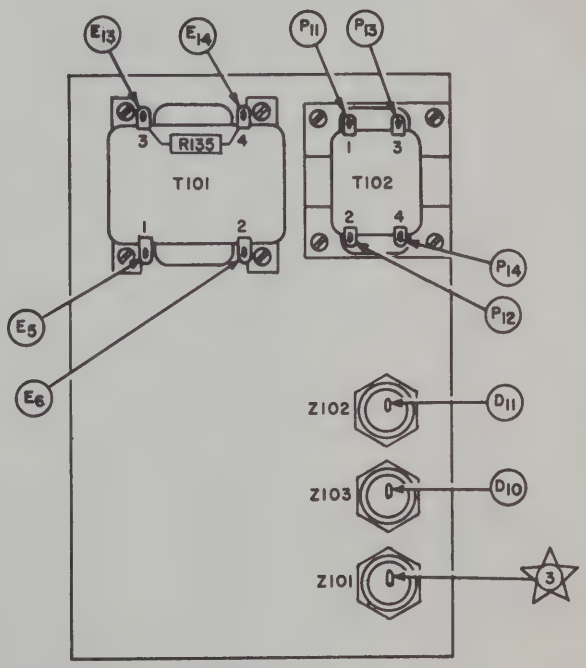


Figure 5-5. Modulation and Pulse Transformers, and Filters

TABLE 5-7. PULSE MODULATOR, FUNCTIONAL SECTION TROUBLE-SHOOTING CHART
(See figures 4-5, 4-6, 5-2, 5-3, 5-5.)

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
		Set up instruments as indicated in paragraph 5-5d.	On screen of Oscilloscope AN/USM-32, 24, 38.	
1	Signal	As connected in paragraph 5-5d, adjust oscilloscope and signal generators for clearest signal. Adjust PULSE VOLTS on pulse generator to 40.	Trace on screen as shown in inset of figure 4-6.	Proceed to next step in any case.
2	Signal	With conditions as in step (1) above, vary PULSE VOLTS control above and below 40.	Trace on screen remains at same amplitude as PULSE VOLTS control goes above 40. Trace on screen gradually reduces in amplitude as PULSE VOLTS control goes below 40.	If indication is normal, then entire pulse operation is normal, and additional testing in this stage is unnecessary. If indication is abnormal, proceed to next step.
3	P_{11} (figure 5-5.)	Remove UHF Diode 1N126 and 1K resistor from set-up shown in figure 4-6. Using the V. INPUT probe of the oscilloscope, connect to test point.	Trace on screen similar to that shown in figure 4-6, except for shorter rise time and decay time of the pulse.	If indication is normal, proceed to next step. If abnormal, check further by turning PULSE VOLTS control to maximum. If still abnormal, check T102, L121 and MOD and METER SELECTOR switch setting and action. If still abnormal feed the output of pulse generator directly to oscilloscope to check testing instruments. If trace appears, reconnect and repeat step (3).
4	P_{13} (figure 5-5.)	Connect the V. INPUT probe to test point.	Trace described in step (3) above with greater amplitude.	If indication is normal, proceed to next step. If step (3) was normal but this step is abnormal, unsolder wire from terminal 3 of T102 and repeat this step. If normal without the wire, resolder the wire and proceed to next step. If abnormal without the wire, test T102.
5	D_7 (figure 5-2.)	Connect the V. INPUT probe to test point.	Trace described in step (4) above.	If indication is normal, proceed to next step. If abnormal, remove V104 from socket and test this step again. If still abnormal, check R133. If normal with V104 out of socket, but abnormal with tube in place, check V104.
6	D_9 (figure 5-2.)	Connect the V. INPUT probe to test point.	Trace described in step (4) above.	If indication is normal, proceed to next step. If abnormal, check R131.
7	D_{10} (figure 5-5.)	Connect the V. INPUT probe to test point.	Trace described in step (4) above.	If indication is normal, then pulse circuit may be considered as normal. If this step is normal, but steps (1) and (2) are still abnormal, then trouble is indicated in rf oscillator stage.

TABLE 5-7. (Continued)

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
8	(D1) (figure 5-2.)	Remove oscilloscope. Connect Multimeter AN/USM-34 by switching to dc scale, connecting black probe to chassis, positive probe to test point.	210 volts. This measures regulated voltage to cathode of V104.	This is merely an operational check. The voltage indication should be correct whether the pulse generator is connected or not. If abnormal, remove V104 and test again. If still abnormal, trace wire to regulated power supply. If indication is normal with tube out, but abnormal with tube in place, check V104.
9	(D4) (figure 5-2.)	On ac scale, connect black probe to chassis, red probe to test point.	6.3 volts. This measures voltage across filament of V104.	This is merely an operational check. If this indication is abnormal, then all previous conclusions on this stage are incomplete, since this stage has been inoperative.

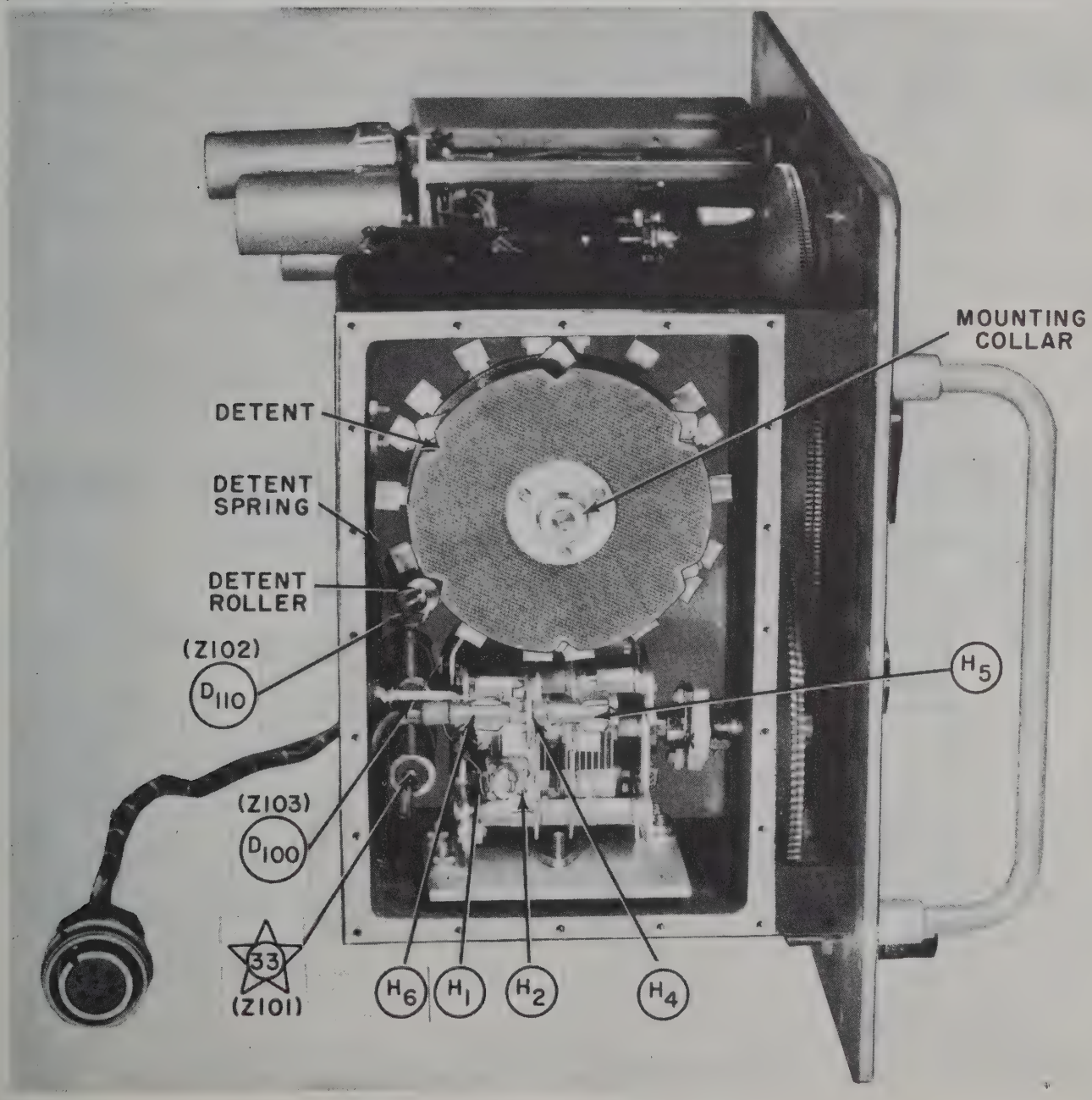


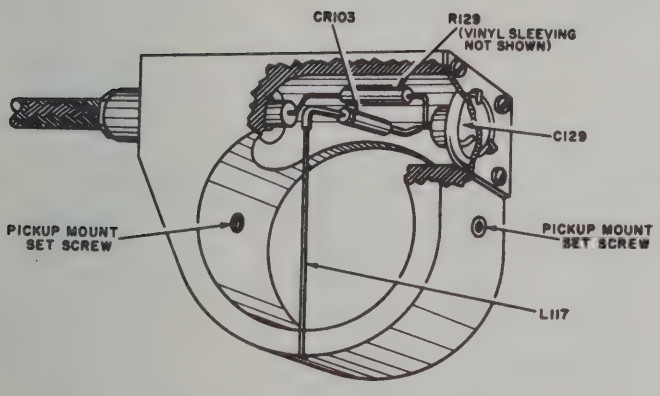
Figure 5-6. RF Oscillator Stage Showing Test Points.

TABLE 5-8. RF OSCILLATOR SECTION, FUNCTIONAL SECTION TROUBLE-SHOOTING CHART
(See figure 4-2, 5-6, 5-7.)

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
	(All test points taken from figure 5-6 except as otherwise noted.)	Follow procedures set forth in paragraphs 3-5 and 3-6, setting the signal generator at 5 mc with 1000~ modulation, RF OUTPUT control at 100K.	(All indication will be shown on Multimeter AN/USM-34 appropriate range, unless otherwise noted.)	CAUTION: Tube V103 is fragile. Do not handle unless it is important for trouble-shooting. Filament leads are especially fragile.
1	☆33	On ac scale, connect black probe to chassis, red probe to test point.	6.3 volts (filament). This measures filament across V103.	If indication is normal, proceed to next step. If abnormal, remove V103 and test again. If still abnormal trace for filament voltage at either side of Z101.
2	H_5	On dc scale, connect black probe to chassis, positive probe to test point.	110 volts. This measures voltage at plate of V103. This voltage subject to slight variations.	If indication is normal, proceed to next step. If abnormal,remove V103 and test again. Voltage should rise to 210 volts with tube removed. If 210 volts is not obtained with tube removed, check step (3) below. If step (3) is normal but step (2) is not, check for continuity of plate coil in use. Switch bands to try another coil.
3	D_{100}	On dc scale, connect black probe to chassis, positive probe to test point.	200 volts. This measures voltage at oscillator side of filter Z103.	If indication is normal, proceed to next step. If abnormal, test other side of Z103 (see test point ○ D10, figure 5-5) for continuity of Z103.
4	H_2	On dc scale, connect black probe to chassis, positive probe to test point. (Avoid shorting across trimmer or diode CR102 will be damaged.)	110 volts. This is same potential at test point ○ H5 in step (2).	If indication is normal, proceed to next step. If abnormal, check coil in use for continuity. Switch bands to try another coil.
5	H_1	On dc scale, connect black probe to chassis, positive probe to test point.	0.38 volts. This measures voltage across CR102.	If indication is normal, proceed to next step. If abnormal, check CR102.
6	H_4	On MINUS DC scale, connect black probe to chassis, positive probe to test point.	−54 volts. This measures voltage at grid of V103.	If indication is normal, proceed to next step. If abnormal, check R121, C123. NOTE: C123 is integral part of main tuning capacitor C122 and is used to make contact with grid disc of V103.
7	D_{110}	Replace Multimeter AN/USM-34 with Oscilloscope AN/USM-32, 38, 24, connect ground to chassis, the V. INPUT of oscilloscope to test point. Set oscilloscope horizontal sweep to 1000 cycles. (See figure 5-8.)	SINE WAVE. Varying % MODULATION control on front panel should vary amplitude of trace accordingly.	If indication is normal, remove oscilloscope and read panel meter. If panel meter reads normal, consider this portion of test completed and go directly to final test, step 9. If indication is abnormal, proceed to next step.

TABLE 5-8. (Continued)

STEP	TEST POINT	PRELIMINARY ACTION	NORMAL INDICATION	NEXT STEP
8	Figures 5-7 4-4 and 5-5.	If trouble is suspected in metering crystal pickup mount, turn off signal generator. Remove test equipment. Remove metering crystal pickup mount (paragraph 6-5f).	Make static test of components in pickup mount. Make ohmmeter test from end of cable to splice inside mount to check R129. Forward and reverse resistance checks will test CR103. Removal of 4 screws from outside plate allows test of C129 for possible short.	If component checks prove normal, then pickup mount may be considered normal. Go to final test. If component checks prove one or more components abnormal, replace those components.
9	Final test	Following the layout in figure 5-8, set up the signal generator and oscilloscope, with 1000 cycle modulation at 4 mc with 50% modulation. Set up oscilloscope as described in Step 7 above.	Trace shown on the oscilloscope figure 5-8. Varying % MODULATION control on front panel should cause amplitude of trace to vary accordingly. Varying RF OUTPUT dial on front panel should cause amplitude of trace to vary accordingly. Varying CARRIER LEVEL dial on front panel should cause amplitude of trace to vary accordingly. Varying TUNING dial on front panel should make changes in rf carrier trace within modulation waveform. Switching to 400 cycles should make it necessary to reset oscilloscope accordingly. Switching to CW should change trace to full sweep of trace without modulation envelope.	If Final Test proves normal, the signal generator may be presumed to be normal, except for possible frequency inaccuracy. That test is covered in paragraph 6-10.



Note: For clarity, resistor R136 is not shown.

Figure 5-7. Metering Crystal Pickup Mount.

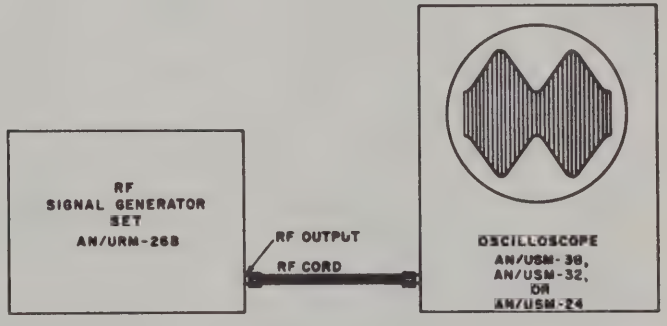
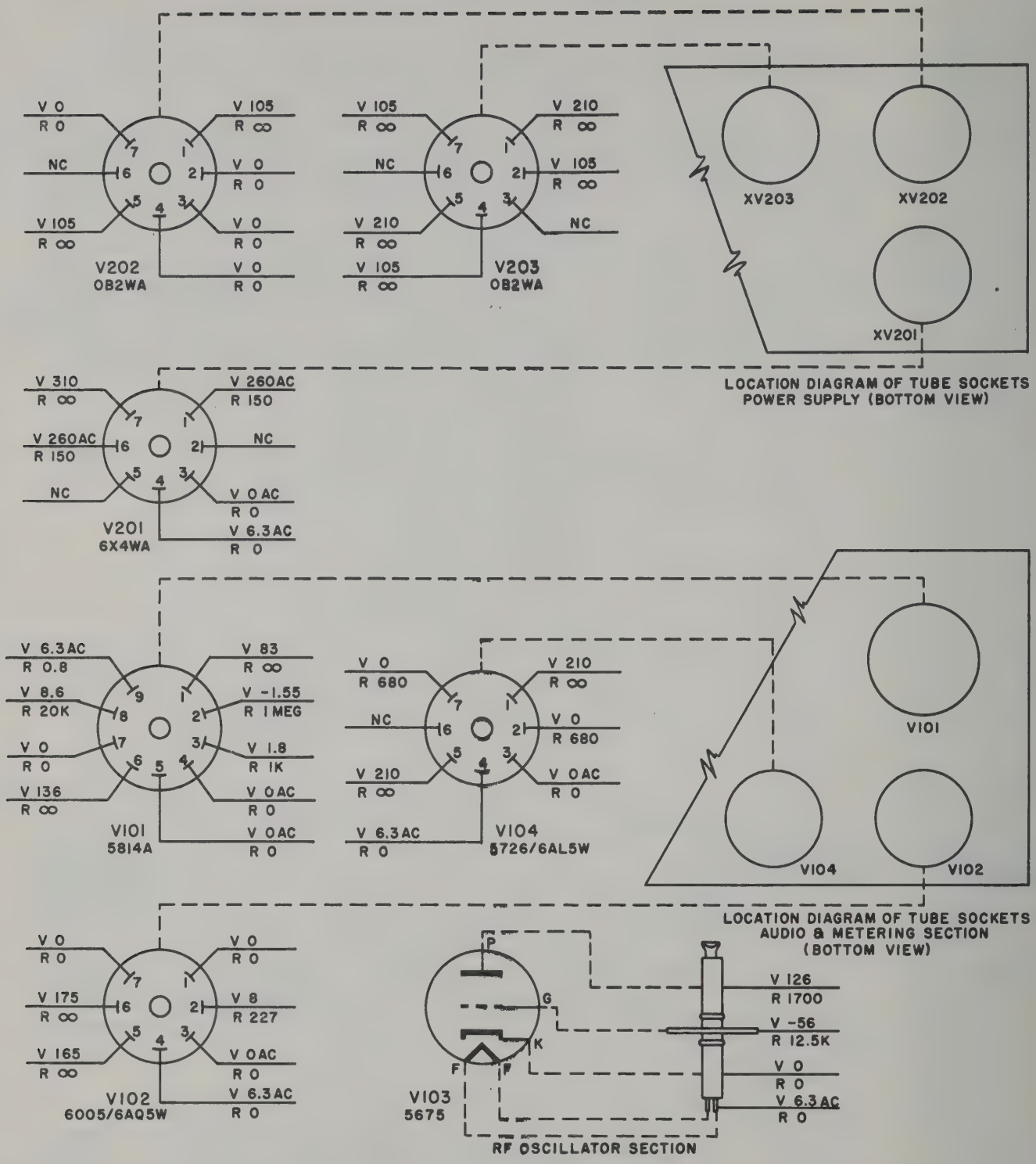


Figure 5-8. Oscilloscope Hookup to Observe RF Output.



NOTES

FOR RESISTANCE MEASUREMENTS, %MOD & CARRIER LEVEL FULLY CW. UNPLUG P101 FROM J201 AND LINE CORD FROM POWER OUTLET. SET S101 AT PULSE, S102 AT BAND A.

FOR VOLTAGE MEASUREMENTS, EQUIPMENT MUST BE OPERATING, SET AT 1000 CYCLES MODULATION, CARRIER AT 5MC, 30% MODULATION, ATTENUATOR AT MAXIMUM OUTPUT.

READINGS TAKEN WITH MULTIMETER ME-25A/U, OR SIMILAR MULTIMETER HAVING A RESISTANCE OF 20,000 OHM/VOLT DC AND 1,000 OHMS/VOLT AC.

KEY TO SYMBOLS

V INDICATES DC VOLTAGE TO GROUND UNLESS OTHERWISE SPECIFIED.

AC INDICATES AC VOLTAGE TO GROUND UNLESS OTHERWISE SPECIFIED.

R INDICATES DC RESISTANCE WITH ALL PLUGS DISCONNECTED.

NC INDICATES NO CONNECTION.

Figure 5-9. Signal Generator Voltage and Resistance Chart.

5-6. TUBE SOCKET ELECTRICAL MEASUREMENTS.

a. The majority of faults must be localized by checking the voltage and resistance at the tube sockets and at key test points in the circuit. The key test points have been specified in Tables 5-4 to 5-8. Figure 5-9, RF Signal Generator Set AN/URM-26B, Voltage and Resistance Chart lists diagrammatically the voltage and resistance measured from all tube socket connections to chassis ground.

b. Except where specified in the footnotes to figure 5-9, all measurements were made with a 20,000 ohms per volt dc meter, and a 1000 ohms per volt ac meter such as contained in Multimeter AN/PSM-4, or TS-352/U or equivalent.

WARNING

High voltages up to 580 volts are exposed when the signal generator is being tested outside of the cabinet. Exercise great care in handling the instrument under these conditions. Highest voltages are in the power supply sub-chassis.

5-7. TYPICAL TROUBLES.

Test instruments like the RF Signal Generator Set AN/URM-26B are always used in conjunction with instruments being tested, so it may be confusing to the technician when trouble is detected, as to whether the trouble is in the instrument being tested, or in the signal generator. To quickly determine whether the trouble is in the signal generator, disconnect the signal generator from the equipment being tested and quickly run through the checks shown in Table 5-9, Typical Troubles. All possible troubles shown in the first column should be checked. The second column shows the normal indication when the signal generator is operating correctly. The third column shows typical nature of trouble with the symptoms of the trouble. The last column is the recommended check and remedy for the fault.

TABLE 5-9. TYPICAL TROUBLES.
(See figure 6-1.)

TROUBLE	NORMAL INDICATION	NATURE OF TROUBLE	CHECK AND REMEDY
POWER INPUT 1. Rotate the CARRIER LEVEL and % MODULATION control completely counterclockwise and turn the POWER switch S103 on.	Pilot lamp I101 lights.	Pilot lamp I101 does not light.	Indicates no ac applied to primary of power transformer T201 (See figure 4-10.) *a.* Check front panel fuses F101, F102. *b.* Check ac source and the continuity thru power plug P102. *c.* Check mating of the plug P101 and jack J201 located on the power supply chassis.
CW RF OUTPUT METERING 2. Rotate MOD and METER SELECTOR switch S101 to CW position. Advance the CARRIER LEVEL control R119 while observing panel meter M101.	Pointer on meter M101 moved toward, and at least up to, the red line on the upper scale.	Meter pointer does not move, or will not advance to red line.	Check circuit operation Step 3. Normal operation indicates that the rf output level metering circuit is faulty. Check the meter M101 by momentarily switching the MOD and METER SELECTOR to 400~ position (See Step 7.) Check the crystal circuit for continuity and conduction ratio as follows: Temporarily turn switch S101 to EXT position and measure dc resistance through R120 to ground and note the reading. Reverse the test leads and repeat the measurement. The difference in reading indicates the effectiveness of the diode. The same reading regardless of the polarization of the ohmmeter indicates a short circuited crystal diode or other component; make continuity checks. Open circuit reading indicates open circuited component or crystal diode.

TABLE 5-9. (Continued)

TROUBLE	NORMAL INDICATION	NATURE OF TROUBLE	CHECK AND REMEDY
3. Connect RF OUTPUT jack J101 to receiver under test (see paragraph 3-9).	Output indication from receiver observed.	No output from receiver (assuming receiver is operating properly).	Operation under step 2, O.K. is an indication of a defect in the attenuator (AT101). which may be caused by burned out resistor R130, open coaxial cable leading from the attenuator to panel jack J101. Measure dc resistance from center pin of J101 to ground (normally 50 ohms).
RF OSCILLATOR 4. Operation as in Steps 2 and 3.	Normal indication in both Steps 2 and 3.	Trouble indication in both Steps 2 and 3.	Trouble indication under both 2 and 3 is indicative that the rf oscillator circuit (V103) is not functioning. The following are possible causes for failure and their remedy. *a.* Check operation on each band. *b.* Check that regulated B + is applied to plate circuit of the oscillator. *c.* Check tube V103. *d.* Check plug P101 connection to jack J201 located on power supply chassis. *e.* Check capacitor C111 and resistor R121.
PULSE MODULATION 5. Place the MOD and METER SELECTOR switch S101 to PULSE position.	Meter (M101) needle remains at extreme left position and does not move when CARRIER LEVEL control R119 is advanced.	See Step 6.	See Step 6.
6. Apply suitable external pulse to PULSE INPUT panel jack J103 (see paragraph 3-8). Connect the RF OUTPUT jack J101 to a radio receiver or demodulator probe and oscilloscope combination.	Pulsed rf output observed. Amplitude of pulse varies with setting of RF OUTPUT attenuator. Slight reading indicated on panel meter depending on the duty ratio of the applied pulse.	No pulsed RF output at panel Jack J101.	Indicates that dc pulses are not supplying plate voltage of sufficient amplitude to operate the oscillator V103 (assuming that the rf oscillator operates normally in CW position). Check the pulse limiter tube V104, RF choke L121. Make sure that the polarity of the input pulse modulation is positive going.
INTERNAL SINE WAVE MODULATION 7. Set the rf carrier circuits for cw operation (See paragraph 3-4). Connect rf output to receiver. Set switch S101 to 400~ position. Slowly rotate the % MODULATION control (R113) clockwise and at the same time observe meter M101. Repeat for 1000~ position.	The pointer of meter M101 rises smoothly at least to the 50 percent calibration mark on the lower scale. Modulation pattern is present in receiver output.	Meter M101 remains at the extreme left of scale and does not move when R113 is rotated. No modulation pattern present on rf carrier.	Check for normal operation in both 400~ and 1000~ positions. *a.* If no modulation in 400~ position only, check the setting of the audio oscillator feedback adjustment R102. Check resistors R109, R111 and associated contacts on switch S101. *b.* If no modulation in 1000~ position only, check resistors R110 and R112 and associated contacts on switch S101. *c.* If no modulation in both 400~ and 1000~ positions of S101, perform the circuit operation given in Step 8 of this chart. If Step 8 operation normal check audio oscillator tube, V101 coupling capacitor C105 and resistor R108, check continuity through switch S101; make voltage and resistance checks at the socket of V101.

TROUBLE	NORMAL INDICATION	NATURE OF TROUBLE	CHECK AND REMEDY
EXTERNAL SINE WAVE MODULATION 8. Set S101 to EXT position and apply a sine wave audio signal to EXT MOD jack J103. Slowly rotate the % MODULATION control clockwise.	The pointer of meter M101 rises smoothly to the 50 percent calibration mark on the lower scale. Modulation pattern present in receiver output.	Meter M101 remains at the extreme left of scale and does not move when R113 is rotated. No modulation pattern present on rf carrier.	Perform circuit operation 7; if O.K. check continuity from panel jack J103 to and through S101.
MODULATION METERING 9. Steps 7 and 8 combined.	Meter M101 indication in both Step 7 and Step 8 normal.	Modulation pattern present on rf carrier but meter M101 does not show a reading in either Step 7 or Step 8.	Indicates trouble in modulation metering circuit. Check C106, R116, S101 for open circuit, and crystal diode CR101 (1N69) for open or short circuits.
SINE WAVE MODULATION AMPLIFIER 10. Steps 7 and 8 combined.	Modulation pattern present in receiver output in both Step 7 and Step 8.	Absence of modulation pattern and no reading on M101 in both Steps 7 and 8.	Indicative of a defect in the MODULATOR amplifier. Check tube V102. Make voltage and resistance check at the socket of V102. (See figures 5-2, 5-3 and 5-4). Check continuity through switch S101.
POWER SUPPLY Remove power supply from case. (See paragraph 6-3*b*.)			
WARNING POTENTIALS UP TO 600 VOLTS EXIST IN THIS EQUIPMENT. USE EXTREME CARE IN HANDLING AND WHEN PERFORMING TESTS.			
REGULATED +210v CIRCUIT 11. Measure this voltage at pin D of jack 201.	Regulated voltage remains constant at 210 volts.	Regulated output voltage higher than plus 210 volts. *a*. Regulated output voltage much lower than +210 volts. *b*. No regulated voltage output.	Indicates defective voltage regulation circuit. Check VOLTAGE REGULATOR tubes V202 and V203. *a*. Check for leaky filter capacitor C202A. Check unregulated B + voltage as given in Step 12 of this table. Check capacitor C203 for short circuit. *b*. Check resistor R202 for open circuit. Perform checks given in Step 12 of this table.
UNREGULATED B+CIRCUIT 12. Measure at pin E of jack J201.	Unregulated B+ approximately 180 volts.	Unregulated output voltage much lower than +180 volts. No regulated voltage output.	Check rectifier tube V201. Check filter capacitors C201, C202A, C202B and for open circuit and for leakage resistance. Check resistance of R201, L201 and T201. Check ac power input circuit as outlined in Step 1 of this table. Check rectifier tube V201 (if tube is defective, perform the following tests before inserting a new one). Check filter capacitors C201, C202A, C202B and C203 for short circuit. Check resistor R201 and choke L201 for open circuit.
OVERALL POWER SUPPLY 13. Ripple voltage.	Negligible amount of 120 cps hum modulation voltage on rf carrier.	Excessive 120 cps hum modulation pattern in modulated or unmodulated rf carrier output.	Indicative of faulty filter section in power supply. Check filter capacitors C201, C202A, C202B and C203 also choke L201, for defects suggested in Step 11 and 12 above.

SECTION 6

REPAIR

6-1. FAILURE REPORT.

FAILURE REPORT

Report each failure of the equipment, whether caused by a defective part, wear, improper operation, or an external cause. Use ELECTRONIC FAILURE REPORT form DD787. Each pad of the forms includes full instructions for filling out the forms and forwarding them to the Bureau of Ships. However, the importance of providing complete information cannot be emphasized too much. Be sure that you include the model designation and serial number of the equipment (from the equipment identification plate), the type number and serial number of the major unit (from the major unit identification plate), and the type number and reference designation of the particular defective part (from the technical manual). Describe the cause of the failure completely, continuing on the back of the form if necessary. Do not substitute brevity for clarity. And remember – there are two sides to the failure report–

"YOUR SIDE"

Every FAILURE REPORT is a boost for you.

1. It shows that you are doing your job.
2. It helps make your job easier.
3. It insures available replacements.
4. It gives you a chance to pass your knowledge to every man on the team.

"BUREAU SIDE"

The Bureau of Ships uses the information to:

1. Evaluate present equipment.
2. Improve future equipment.
3. Order replacements for stock.
4. Prepare field changes.
5. Publish maintenance data.

Always keep a supply of failure report forms on board. You can get them from the nearest District Publications and Printing Office.

6-2. TUNING AND ADJUSTMENT.

The Operator's Section (Section 3) describes the normal operation (including adjustment) of the signal generator. A trouble symptom chart is included in Table 6-1 where checks can be made for normal operation and trouble symptoms can be quickly spotted. References to paragraphs with detailed information is given where required. Start at the top and keep working down, following the arrows to only those blocks which apply to the condition noted. No instruments are required for the simple checking. Where instruments are needed for detailed troubleshooting, the instruments listed in paragraph 5-4 will apply.

6-3. REMOVE THE SIGNAL GENERATOR AND POWER SUPPLY FROM THE CASE.

a. REMOVING RF SIGNAL GENERATOR SG-117/URM-26B. – Since this is a precision instrument, great care should be taken when removing it from the case for maintenance purposes. Carefully follow this procedure:

(1) Loosen the twelve captive screws (marked "X"; see figure 6-1) located around the outer edge of the front panel.

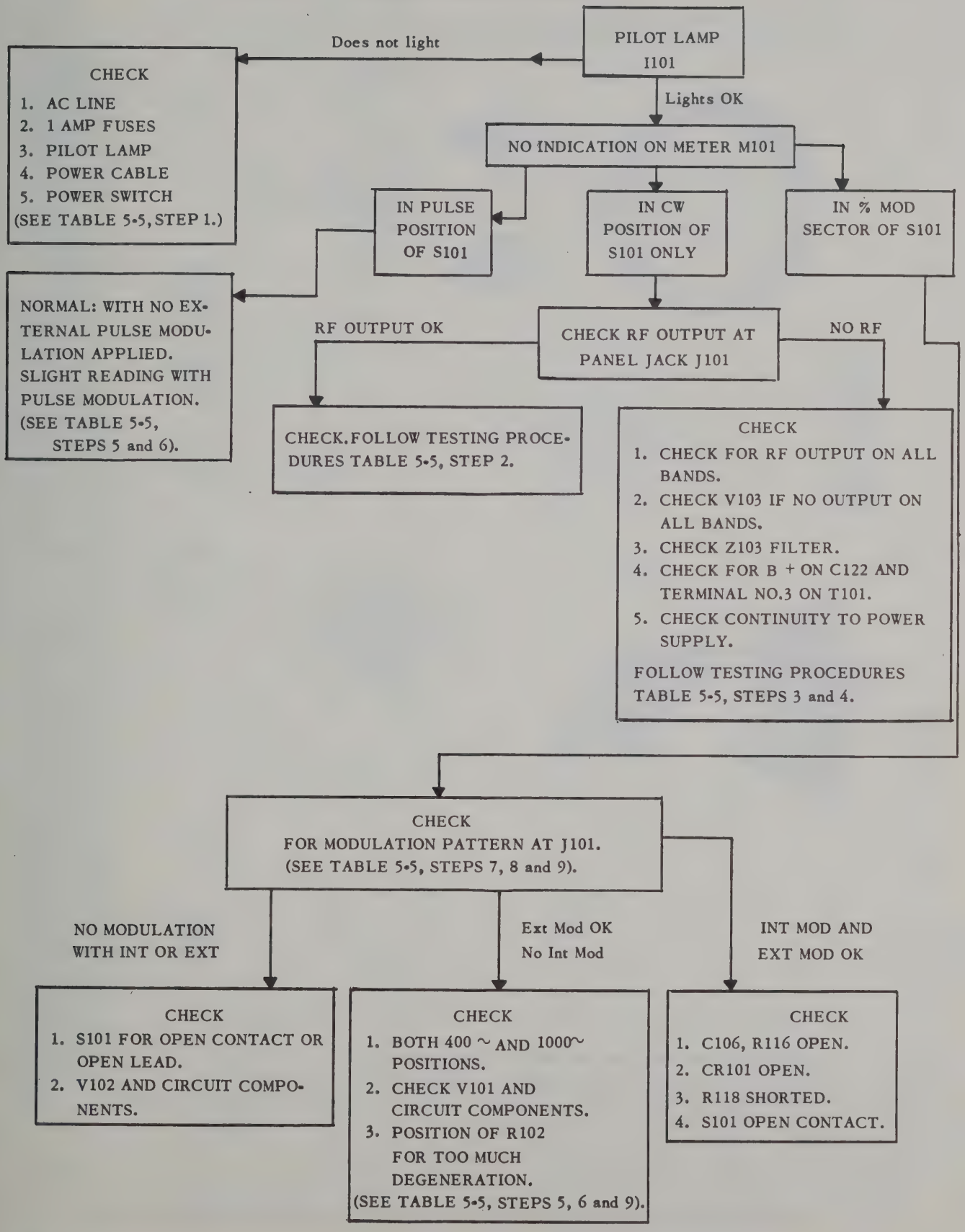
(2) Gently pull the signal generator chassis from the case, using the lifting handles provided on the front panel. The signal generator can be completely removed because the cable connecting it with the power supply is purposely long enough to enable the power supply to remain in the case while the signal generator is out.

b. REMOVING POWER SUPPLY PP-1215/URM-26B.

(1) Ordinarily, the power supply should not be removed from the case. The signal generator operates normally with the power supply left in the case.

(2) To work on the power supply, it is necessary to remove it from the case. Take out three binding-head screws located on the bottom of the case, and three others located on the rear of the case. These screws are marked "Y" in figure 6-2.

TABLE 6-1. TROUBLE SYMPTOM CHART.



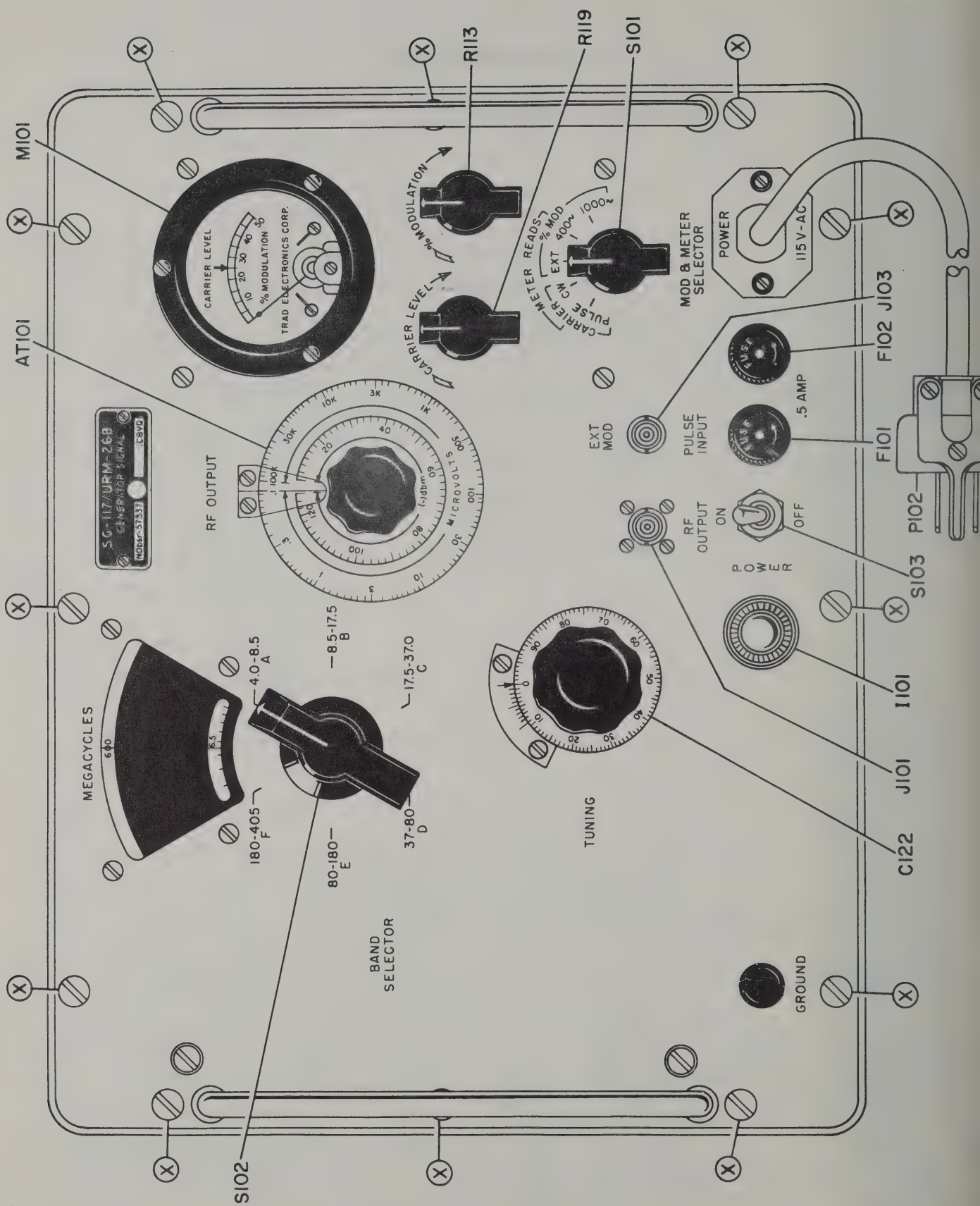


Figure 6-1. Front Panel View for Removal of RF Signal Generator SG-117/URM-26B from Case.

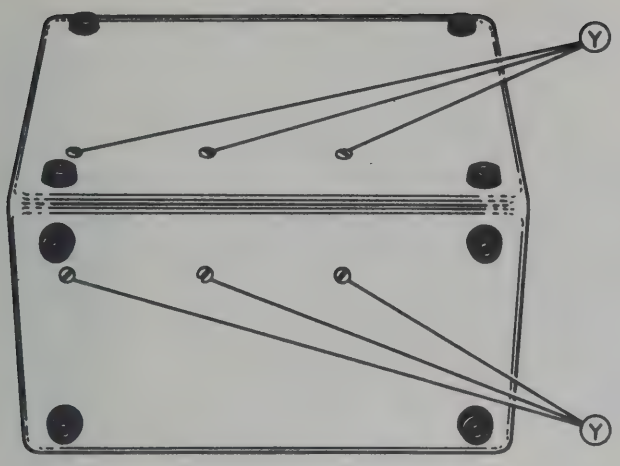


Figure 6-2. REAR VIEW FOR REMOVAL OF POWER SUPPLY PP-1215/URM-26B FROM CASE.

WARNING

High voltages up to 580 volts are exposed when the signal generator is being tested outside of the cabinet. Exercise great care in handling the instrument under these conditions.

6-4. REMOVAL AND REPLACEMENT OF PARTS.

a. Whenever repairs are made involving the removal or replacement of any component part, the part removed should be marked or tagged for identification and its exact position in the equipment carefully noted and recorded so that when the new part, or the same part, is replaced the equipment will be the same as before. This precaution is particularly important when replacing rf components such as coils and capacitors. The correct location of these parts and their associated wiring plays an important part in the proper operation of the equipment.

b. Whenever any parts are replaced with new ones always use the identical type listed and described in Section 7, Table 7-1. When the exact part is not immediately available and it is absolutely necessary to operate the equipment, substitue a similar part having approximate electrical and mechanical characteristics. This is not recommended as a normal procedure and the exact replacement should be ordered. The substitute part should be removed as soon as the exact replacement is received.

6-5. REMOVING AND REPLACING RF OSCILLATOR COMPONENTS.

Whenever it is necessary to calibrate the signal generator or to replace any rf components, it will be necessary to expose the rf section. These instructions are meant to be used only when indications are clear that the rf oscillator section must be opened. Do not casually open this critical unit for routine servicing. Where necessary, carefully follow this procedure for disassembling the rf oscillator section. (See figures 5-6 and 5-7, figures 6-3 through 6-7.)

a. REMOVING RF OSCILLATOR COVER PLATE. – Remove the 20 screws and lockwashers holding rf compartment cover. Remove the cover. This exposes the rf oscillator compartment.

b. REMOVING RF OSCILLATOR TUBE V103. (See figure 5-6.) – CAUTION: Tube V103 is very fragile and should be removed only when really necessary. Disconnect filament socket by carefully drawing the socket off in a line with the tube pins to avoid damaging the tube. Next, insert index finger under plate end of tube, raising tube while spreading the plate bracket with thumb of same hand. This frees one end of the tube. Gently work out entire tube by continuing to raise plate end until tube is free. Use only fingers, avoiding undue strain on disc seal.

c. REMOVING COIL TURRET. – Using No.8 Allen wrench, loosen 2 set-screws on mounting collar (see figure 5-6). Raise the detent spring. Remove detent roller. Centering detent spring between wiper contacts of the turret, lift the turret out with the fingers.

d. REMOVING TUNING CAPACITOR. – Unsolder black tube filament lead from ground point of capacitor. Unsolder ground strap from capacitor to case. Unsolder white and blue wire (oscillator B+). Remove the three tuning capacitor mounting screws (6 x 32) with washers (See figure 6-3.) holding tuning capacitor to casting. *(Avoid disturbing the adjustment of the three stand-off adjustment-alignment ¼" studs.)* Work the tuning capacitor out gently with the fingers. (It may be of aid to vary the TUNING dial to a point more favorable for removal of the tuning capacitors; see figure 6-5.)

e. REMOVING A COIL FROM THE TURRET. (See figure 6-4.) – Remove the two coil-bracket screws for the faulty coil. Unsolder the 3 coil leads. The coil and its holder are now free. Now, remove the coil from the holder by unscrewing the hex-nuts at the end. The replacement coil must be first attached to the coil-bracket, then the coil-bracket assembly is attached to the turret.

f. REMOVING METERING CRYSTAL PICKUP MOUNT. (See figure 5-7.) – Unsolder cable from Z102 (Test point D110, figure 5-6.). With No. 6 Allen wrench, loosen pickup mount set screws. It is necessary to lower the attenuator cylinder slightly. This is done by unscrewing cylinder retaining screw slightly (see figure 6-3) and slipping cylinder down enough to free the pickup mount. Remove mount completely by withdrawing with fingers.

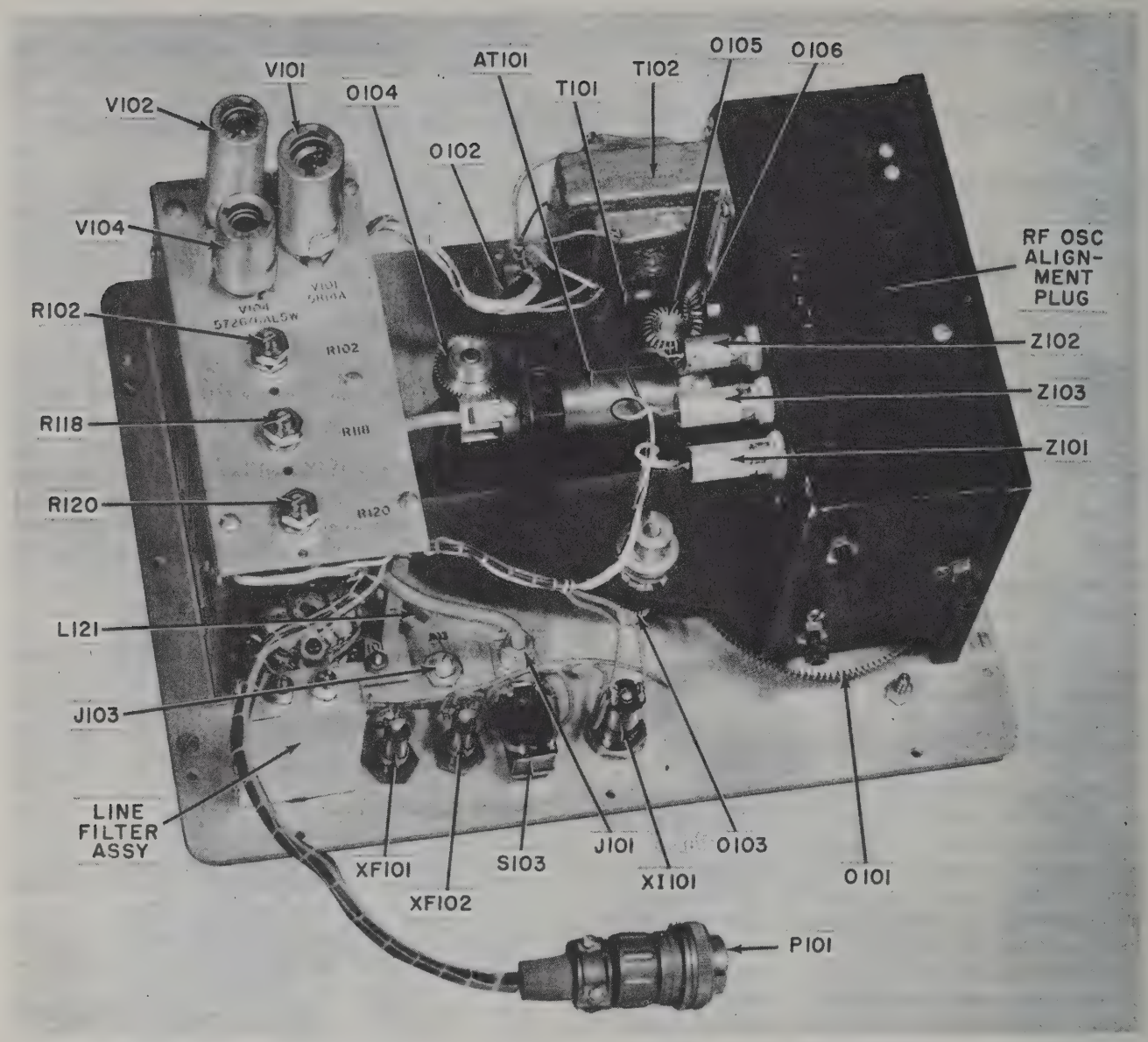


Figure 6-3. Rear View of Signal Generator SG-117/URM-26B.

6-6. REMOVING RF ATTENUATOR.

The technician is cautioned against unnecessary removal of this unit. Only if R130 or L118 or a mechanical component requires replacement should the attenuator be removed. If removed and replaced, it is necessary to follow with recalibration procedures (see paragraph 6-11). To remove rf attenuator first remove the metering crystal pickup mount (see paragraph 6-5f). Then unscrew cylinder retaining screw (see figure 6-3). This frees the cylinder, which can be drawn out through the rf compartment side. Remove the output cable by unscrewing the hex retaining collar which attaches the rf output cable to the front panel. Pull the cable out of the connector. Loosen the two screws holding the anti-backlash bearing against the piston (see figure 6-6). Draw the piston assembly out through the rf compartment side.

6-7. DISASSEMBLY OF RF ATTENUATOR.

Remove the two slotted-head screws in the attenuator head (see figure 6-6). With a pencil-tip iron unsolder coil L118 from the attenuator head. While the solder joints are still fluid, draw up the coil. It will come off, together with the insulating disc. Loosen two set-screws in piston head and remove head from piston. Remove grounding screw. Remove resistor R130. When replacing resistor, shape end into hook for grounding screw. Other end of resistor is soldered to L118.

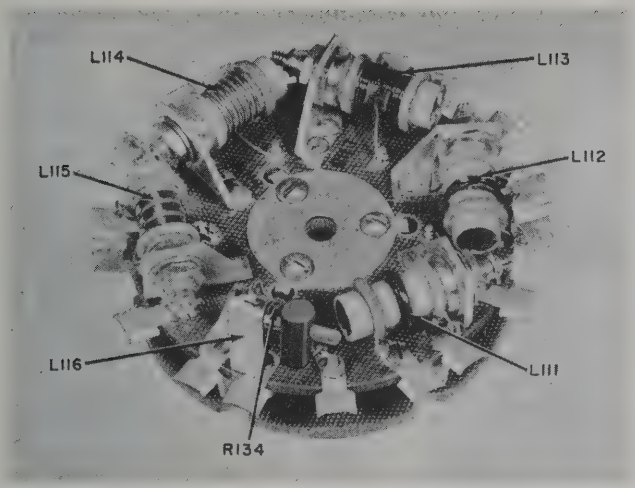


Figure 6-4A. Oscillator Coil Turret, Top and Bottom Views

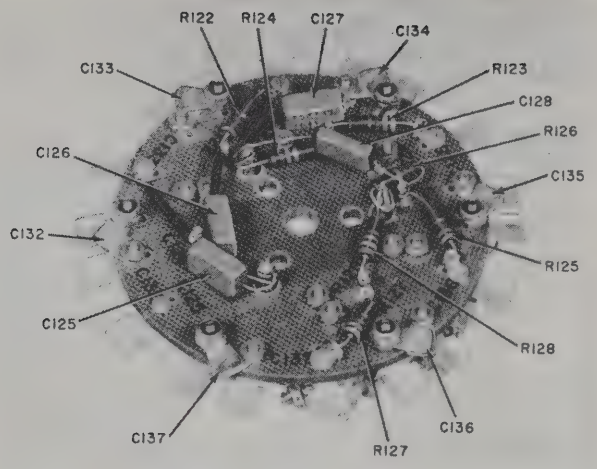


Figure 6-4B. Oscillator Coil Turret, Top and Bottom Views.

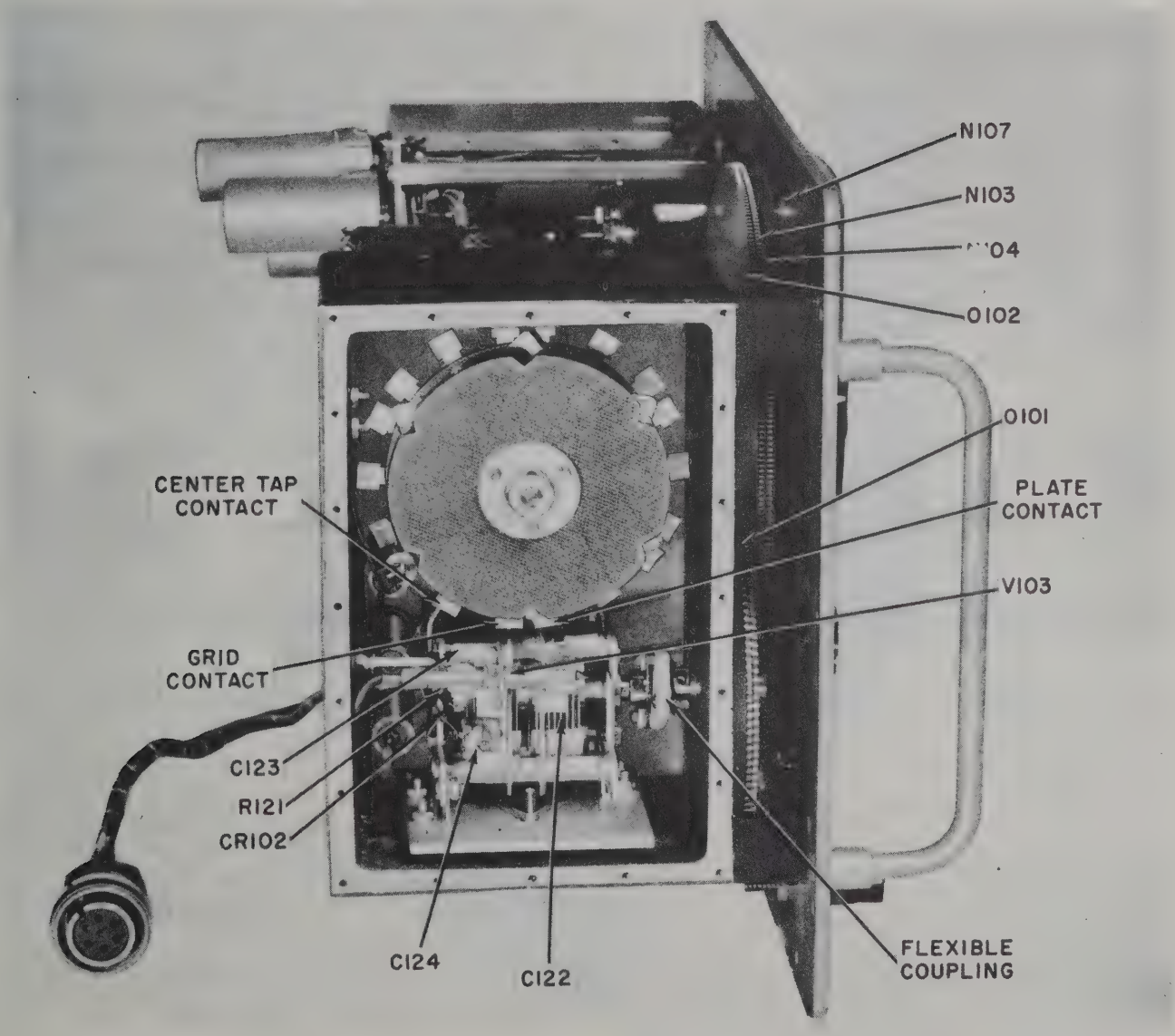


Figure 6-5. RF Oscillator and Variable Capacitor Subassembly.

NOTE

After rf attenuator is reassembled, it will be necessary to calibrate microvolts output (see paragraph 6-11).

6-8. REMOVING LOW-PASS FILTER SUBASSEMBLY. (See figures 6-3 and 5-6).

Unsolder the wires connected to the filter subassembly it is desired to remove. The outside connector is shown in figure 6-3. The inside connector is shown in figure 5-6. If the rf oscillator cavity is not open, it is necessary to expose it as described in paragraph 6-5a. With soldered leads freed, the filter subassembly is removed as a complete cylinder by unscrewing it from the outside back of the oscillator cavity.

6-9. REMOVING AUDIO COMPARTMENT.

The audio, pulse and metering section subassembly is exposed when the signal generator is removed from its case (see paragraph 6-3). The general view of this subassembly is shown in figure 6-7. Accessibility to all the parts is limited, since the subassembly is shaped like the letter "U" laid on its side. However, the top section is easily removed by removing the 4 screws shown in figure 6-7. The top is then lifted up and folded back, as shown in figure 6-8.

6-10. RECALIBRATING RF OSCILLATOR. (See Table 6-2, figures 6-3, 6-4 and 6-9.)

a. WHEN TO RECALIBRATE. – The signal generator should be recalibrated whenever the frequency error is in excess of ±1%, and whenever any oscillator part is replaced. This recalibration is accomplished by adjusting the applicable coils and trimmers. Because of the precision required, recalibration should be performed only as required, and by qualified maintenance personnel with adequate equipment. (A jig to replace the rf oscillator cover plate, with hole for trimmer adjustment should be prepared by maintenance personnel.)

b. RECOMMENDED TEST EQUIPMENT FOR RECALIBRATING.

(1) Navy Model LM-13 Frequency Meter (125 kc to 20 mc).

(2) Frequency Meter TS-232/UR (20 mc to 480 mc).

(3) Headset HS-30, for monitoring zero beat.

c. RECALIBRATION SET UP. – Remove the signal generator from its cabinet (see paragraph 6-3a). Interconnecting power cable is of sufficient length as to permit the instrument to operate satisfactorily out of the cabinet. Insert a bent piece of wire as antenna in the RF OUTPUT jack on the front panel of the signal generator (see figure 6-9). (In the case of Navy Model LM-13 Frequency Meter, it may be necessary to insert a similar bent wire as receiving antenna in the RF COUPLING binding post of the frequency meter to get satisfactory rf coupling.) Plug the headset into the phone jack of the frequency meter. Unscrew the oscillator alignment plug (see figure 6-3) from the case of the oscillator coil section, exposing the slug of the coil in use. Replace rf oscillator cover plate with jig plate with hole exposing trimmer of the coil in use. Plug in the ac cord of the signal generator. Turn on the signal generator and the frequency meter, using Navy Model LM-13 Frequency Meter for bands A, B and the lower range of C, using Frequency Meter TS-323/UR for the upper range of band C and for all the higher bands. Listening with the headset, when a given frequency is set on the frequency meter as a standard, vary the dial of the signal generator to the same setting, slowly rocking the vernier dial back and forth to find the exact frequency. As the signal generator frequency approaches the frequency meter setting, audio oscillation will be heard in the headset. The sound (representing the beat note between oscillators) will go down in frequency until at the exact point where the two instruments record the same frequency, the beat note will disappear. That is the point to calibrate the signal generator. The audio beat will appear on both sides of the *null*. It is the null (no signal) point, however, which is the calibration point.

d. RECALIBRATION PROCEDURE AT THE LOW END.

(1) Set BAND SELECTOR dial to BAND A (lowest frequency band) on signal generator.

(2) Switch MOD and METER SELECTOR to CW position on signal generator.

(3) Turn TUNING dial until lowest frequency is shown in MEGACYCLES window.

(4) Make certain power is plugged in and signal generator is ON.

(5) Adjust RF OUTPUT dial for output which gives clearest *null* point in headset.

(6) Make certain frequency meter is ON.

(7) Switch modulation OFF on frequency meter.

(8) Switch frequency meter to appropriate range and exact setting of 4 mc (see Table 6-2).

(9) Adjust amplitude of frequency meter (RF COUPLING or similar dial) to give clearest *null* point in headset.

(10) Adjust TUNING dial of signal generator for null in headset. The TUNING and MEGACYCLES dials should read exactly 4.0 megacycles. If they do not, use an insulated screwdriver and adjust the core of the coil in use, as available through the oscillator alignment hole, moving the slug *in* or *clockwise* to *increase inductance* and *decrease frequency*, moving the slug *out* or *counterclockwise* to *decrease inductance* and *increase frequency*. Adjust until the dials read exactly 4 mc at the null point.

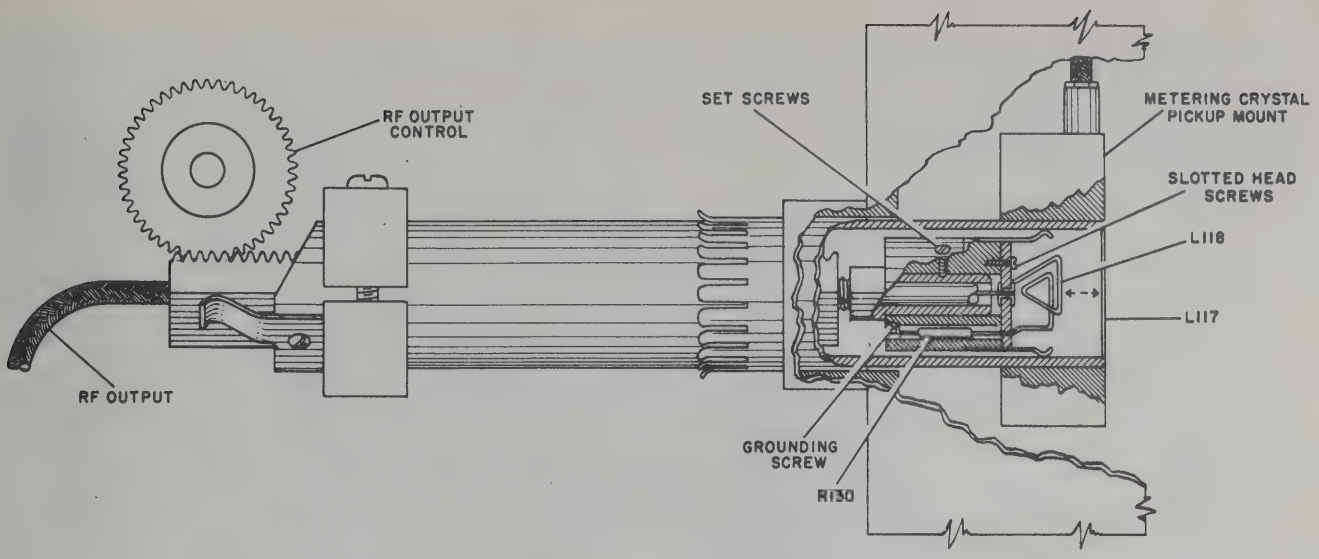


Figure 6-6. Waveguide-Below-Cutoff Attenuator Cut-Away View, Showing Internal Construction.

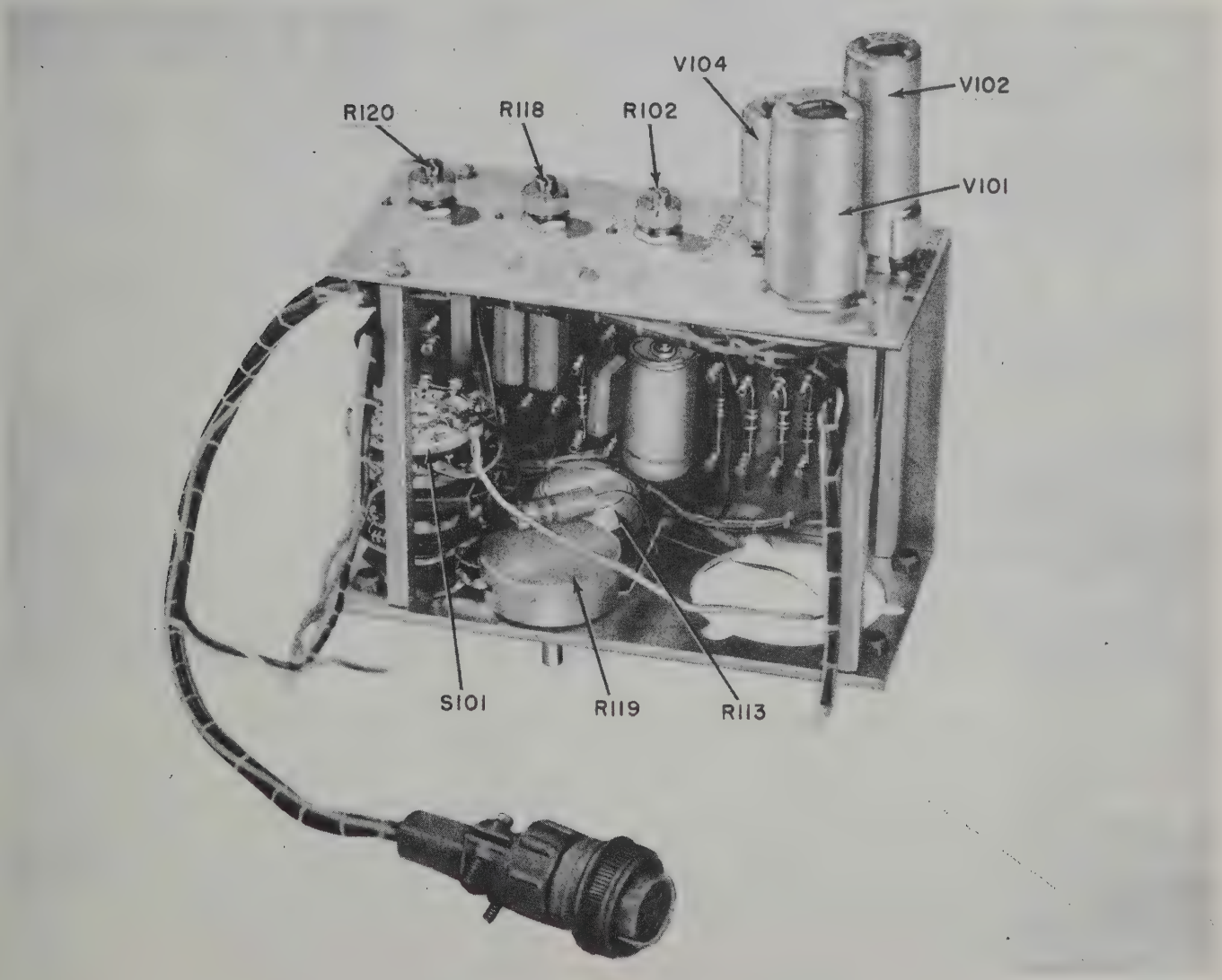


Figure 6-7. Audio and Metering Section Subassembly, General View.

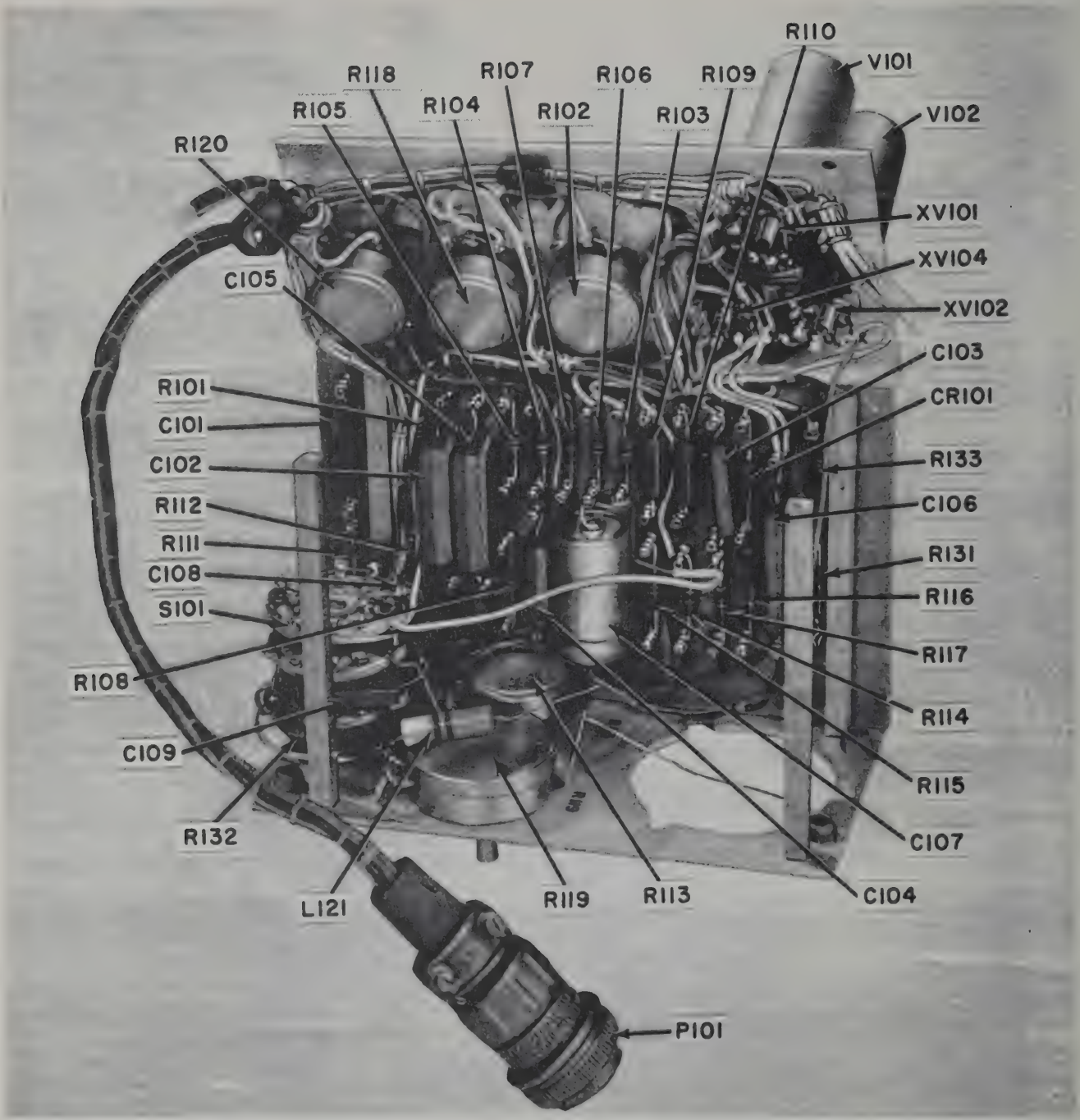


Figure 6-8. Bottom View of Audio and Metering Section Sub-chassis.

e. RECALIBRATION PROCEDURE AT THE HIGH END. – After the low frequency end of the coil is recalibrated, it is necessary to recalibrate the high frequency end. This is done by means of the trimmer adjustment.

(1) Leaving the instruments at the settings of sub-paragraph *d* above, turn TUNING dial on signal generator until highest frequency is shown in MEGACYCLES window.

(2) Adjust frequency meter to exact setting of 8.5 mc (see Table 6-2).

(3) Adjust TUNING dial of signal generator for null in headset. The TUNING and MEGACYCLES dials should read exactly 8.5 mc. If they do not, adjust the trimmer of the coil in use, as available through the trimmer alignment hole in the oscillator shield plate.

(4) Readjust coil for optimum accuracy at both low and high frequency ends of the band.

f. RECALIBRATION PROCEDURE FOR ALL BANDS. – Following the procedures in sub-paragraphs *d* and *e* above, switch through all the bands, adjusting coil core and trimmer capacity for optimum accuracy at both low and high frequency ends of the band. It will be necessary to change frequency meters on Band C as described in sub-paragraph *c* above. Replace the alignment hole plugs when the recalibration is through.

CAUTION

After the necessary adjustments have been made on the upper and lower ends of the band being calibrated, the corresponding calibrations should be correct throughout the frequency range. If not, the main tuning capacitor C122 may be defective. One common way that this variable capacitor becomes defective is through *plate bending*. Never bend the plates of the capacitor in attempting to make an adjustment.

6-11. RECALIBRATING MICROVOLTS OUTPUT.

a. WHEN TO RECALIBRATE. – The RF OUTPUT dial should be recalibrated whenever any component connected to the dial or attenuator AT 101 has been removed, or whenever it is suspected that the voltage error is greater than ±10% up to 100 mc or ±20% above 100 mc.

CAUTION

In general, only overhaul activities should recalibrate RF OUTPUT, since its resetting calls for experienced maintenance personnel.

b. RESETTING MICROVOLTS SCALE. – Resetting the microvolts scale should be done only with the help of a rf power measuring set (bolometer). In case such an instrument is not available, an approximate method is given below.

(1) Set up the signal generator for CW operation at 5 mc (see paragraph 3-4).

(2) Connect Impedance Matching Network CU-439/URM-26B to RF OUTPUT jack on front panel, through the short RF Cord.

(3) Connect the other end of the network to the ac input of Multimeter AN/USM-34 (through appropriate probe adapter).

(4) Test RF OUTPUT dial by turning it completely counter-clockwise. It should read 100K at the stop. If it does not, loosen the two set screws in the dial hub (located below attenuator driving gear, figure 6-3) and reset the dial so it reads 100K at the stop.

(5) Turn on the signal generator and the multimeter (if not already turned on).

(6) Adjust CARRIER LEVEL control so meter reads at SET CARRIER red line.

(7) Adjust the multimeter to the proper ac range (1 volt scale). Depress the PRESS FOR PEAK TO PEAK lever on the multimeter, reading the RMS scale on the 1 volt range. If the actual reading on the multimeter is ±10% of .1 volt, then the instrument is within tolerance. If the instrument is not within tolerance, adjust R120 RF OUTPUT CAL (see figure 5-3) until the multimeter reads within ±1 volt.

(8) Change the frequency on the signal generator to 7 mc. Go through steps (1) to (7) again. If there is a change in setting of R120, go through

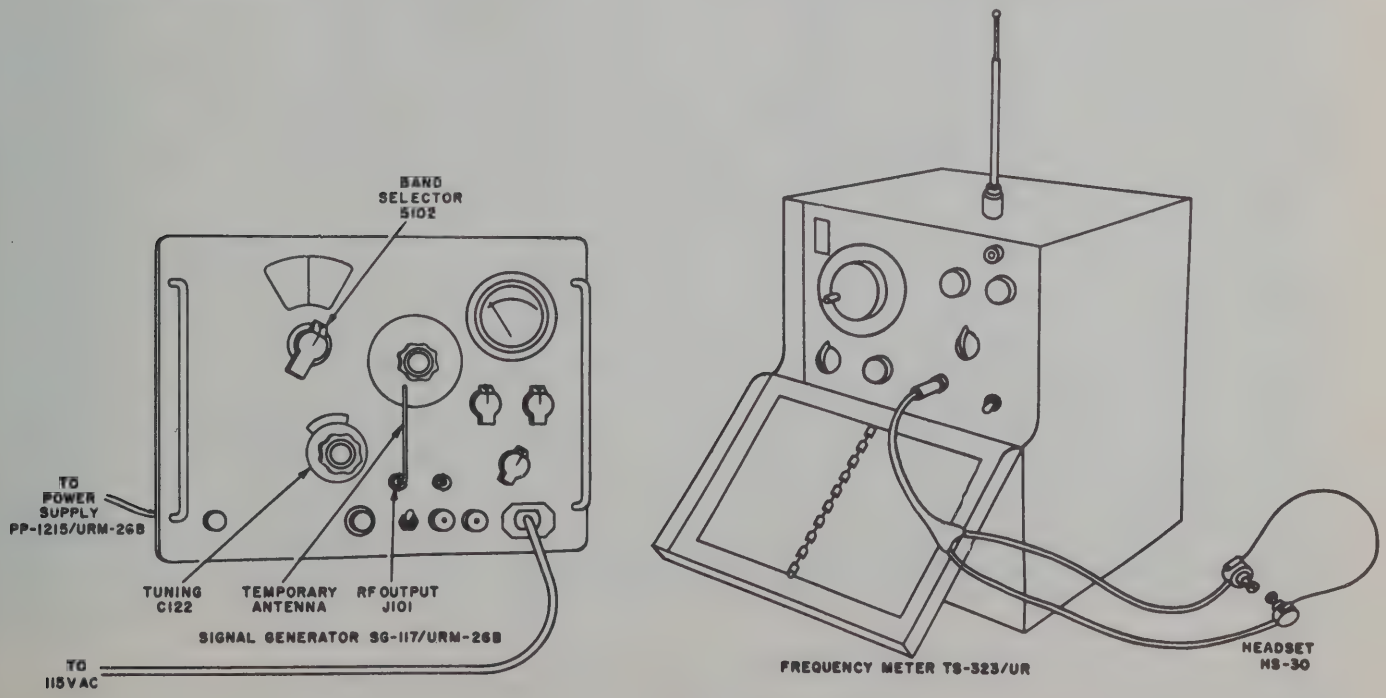


Figure 6-9. Recalibration Setup.

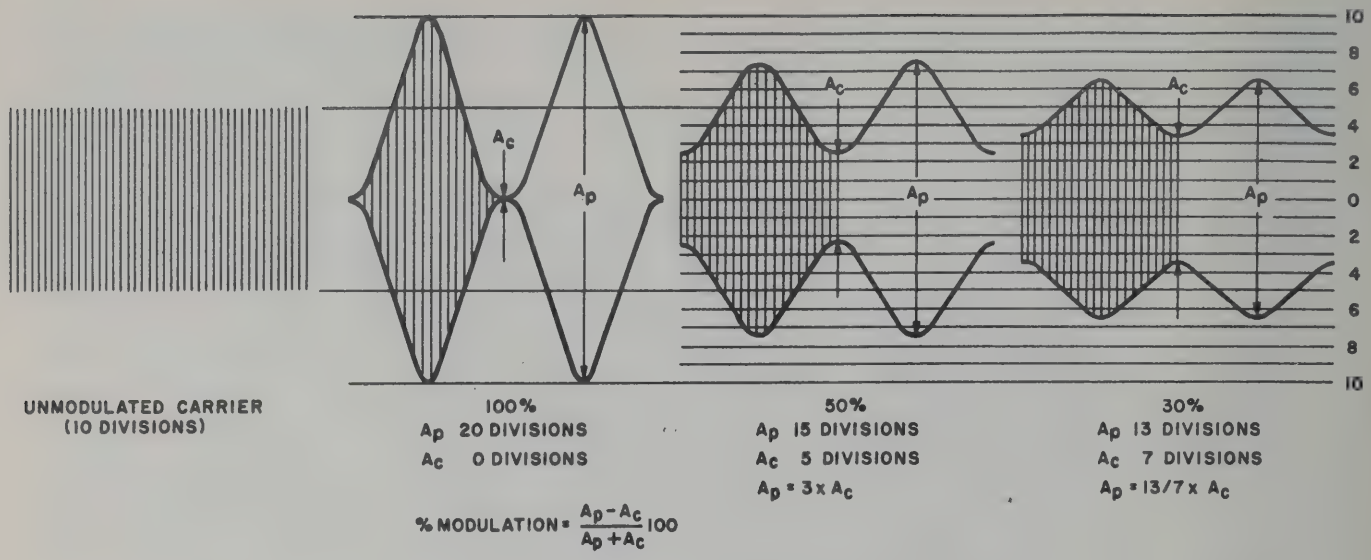


Figure 6-10. Percentage Modulation Chart.

the 4 mc setting and find one setting which permits the microvolts output to be within tolerance of both positions.

(9) Change the frequency of the signal generator to the low and high end of all bands up to 100 mc, going through the re-setting procedures above, leaving R120 setting at a point within tolerance of all check points.

c. CHECKING DECADE OF MICROVOLTS SCALE. – The decades (decimal parts of the maximum 100K output of the RF OUTPUT dial) should be checked whenever mechanical or electrical repairs affecting the attenuator are made. In general, this will be an overhaul activity, since any possible correction calls for experienced maintenance. Checking, however, can be done in the field as follows:

(1) Set signal generator for CW operation at 5 mc (see paragraph 3-4).

(2) Connect long RF Cord to RF OUTPUT jack on the front panel.

(3) Terminate cord with (10:1) Fixed Attenuator CN-316/URM-26B.

(4) Connect the 10:1 attenuator to Impedance Matching Network CU-439/URM-26B using short RF Cord.

(5) Connect the other RF Cord to the other end of the impedance matching network, connecting the other end of the cord to a sensitive receiver such as Navy Model RBC.

(6) Connect the dc probe of Multimeter - ME-25A/U across the second detector in the receiver (i.e. from pin 5 of V305 to ground in the RBC).

(7) Tune the receiver to the signal generator frequency (5 mc) with AVC off. Be sure not to overload the receiver.

(8) Adjust RF OUTPUT dial for a reading of 100K.

(9) Record the receiver output level as indicated on Multimeter ME-25A/U.

(10) Reduce the signal generator output to read 10K.

(11) Remove the attenuator and its cord, leaving the impedance matching network and its cord completing the circuit between generator and receiver.

(12) Adjust RF OUTPUT dial until the level shown on Multimeter ME-25A/U is the same as in step (9) above. The difference in reading on the RF OUTPUT dial represents the output error. For example; if RF OUTPUT reading of 9.8K gives the same level on the multimeter as shown in step (9), the voltage error is 2 parts in 100 or 2%.

(13) Repeat the above procedure for all decades, such as 1K, 100, 10 and 1.

(14) An appreciable error on all or some decades, indicates that something is wrong with the drive system of the attenuator.

(15) Slight voltage errors may be present. For greatest accuracy in use of the instrument, these errors should be recorded and correction factors applied in use for maximum accuracy during alignment.

6-12. RECALIBRATING PERCENTAGE MODULATION. (See figure 6-10).

The percentage of modulation should be recalibrated whenever it is suspected that the error is greater than ±10%.

a. Remove RF Signal Generator Set AN/URM-26B from cabinet (see paragraph 6-3*a*) leaving the power supply connected by its cable.

b. Set up the signal generator for CW operation at 5 mc carrier frequency (see paragraph 3-4).

TABLE 6-2. FREQUENCY CALIBRATION DATA

FREQUENCY RANGE	LOW END – ADJUST COIL		HIGH END – ADJUST TRIMMER (AND CHECK LOW END)	
BAND	FREQUENCY	COIL	FREQUENCY	TRIMMER
A	4 mc	L111	8.5 mc	C132
B	8.5 mc	L112	17.5 mc	C133
C	17.5 mc	L113	37 mc	C134
D	37 mc	L114	80 mc	C135
E	80 mc	L115	180 mc	C136
F	180 mc	L116	405 mc	C137

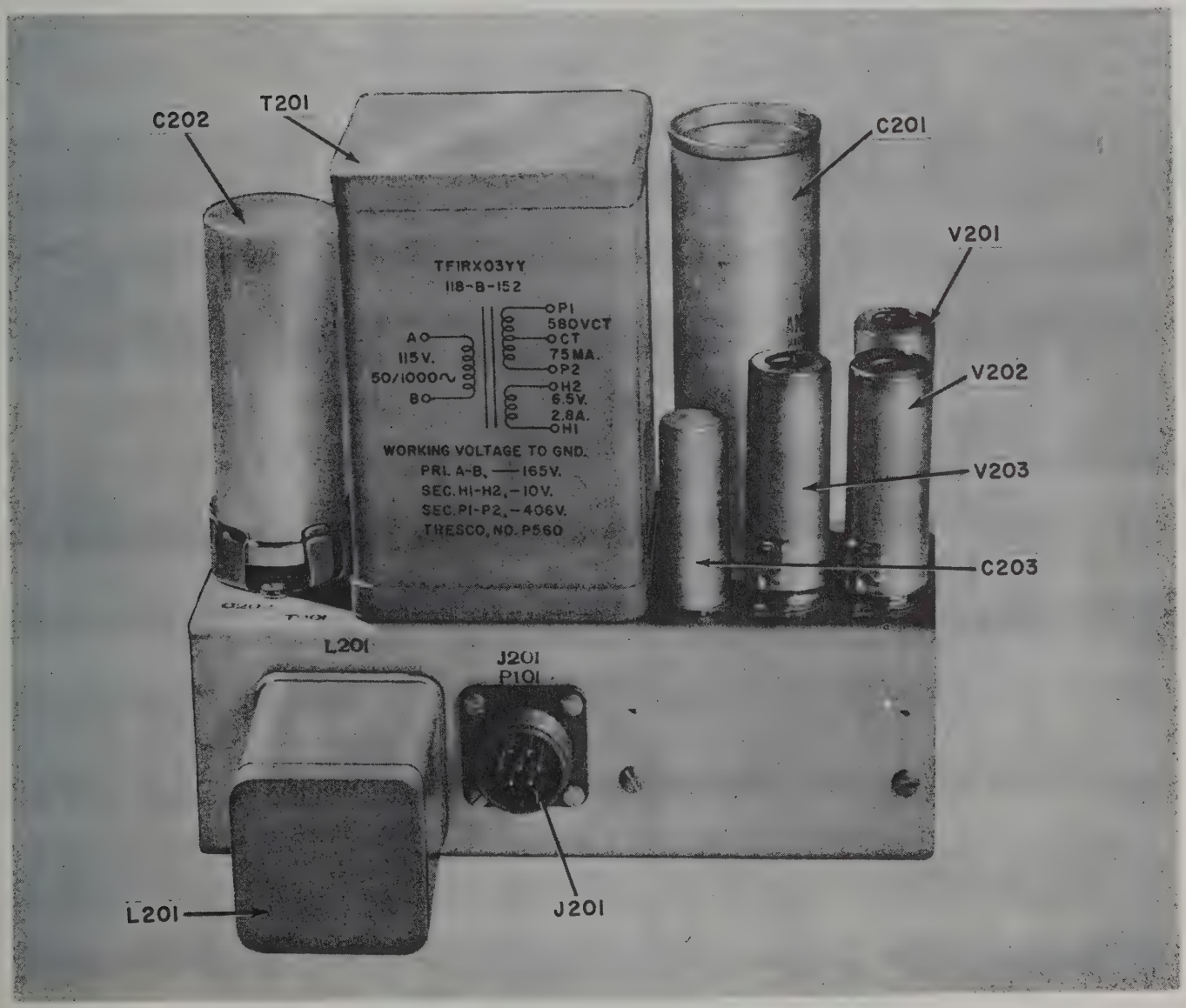


Figure 6-11. Top View of Power Supply PP-1215/URM-26B.

c. Connect the output of the signal generator through rf cord to the input of Navy Model RBC Receiver.

d. Connect Oscilloscope AN/USM-38 across the second detector of the receiver (from pin 5 of V305 to ground in the RBC).

e. Tune the receiver to the CW (5 mc) signal of the signal generator, using the receiver meter or connecting the dc probe of Multimeter ME-25A/U across the second detector of the receiver.

f. Apply 400 cycle modulation to the signal generator. Adjust % MODULATION dial for a reading of 50% on the panel meter.

g. Adjust R113 % MODULATION control (see figure 3-1) until the modulated pattern on the oscilloscope corresponds to 50% modulation (see figure 6-10).

h. Rotate % MODULATION dial for 30% modulation on panel meter and check oscilloscope pattern. If oscilloscope does not show 30% modulation, readjust R113.

i. Repeat adjusting R113 until both modulations read nearly correct, but favor the more widely used modulation.

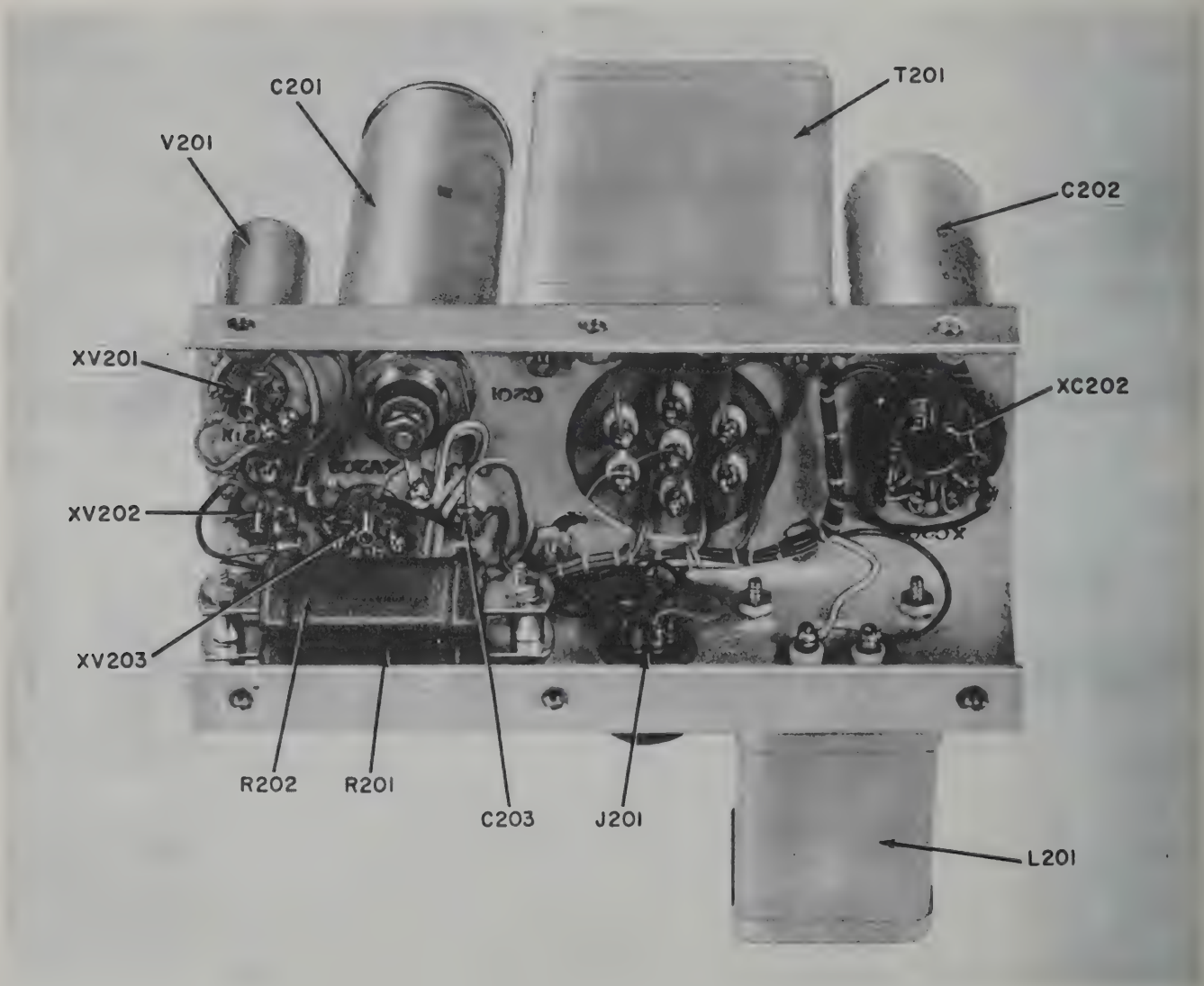


Figure 6-12. Bottom View of Power Supply PP-1215/URM-26B.

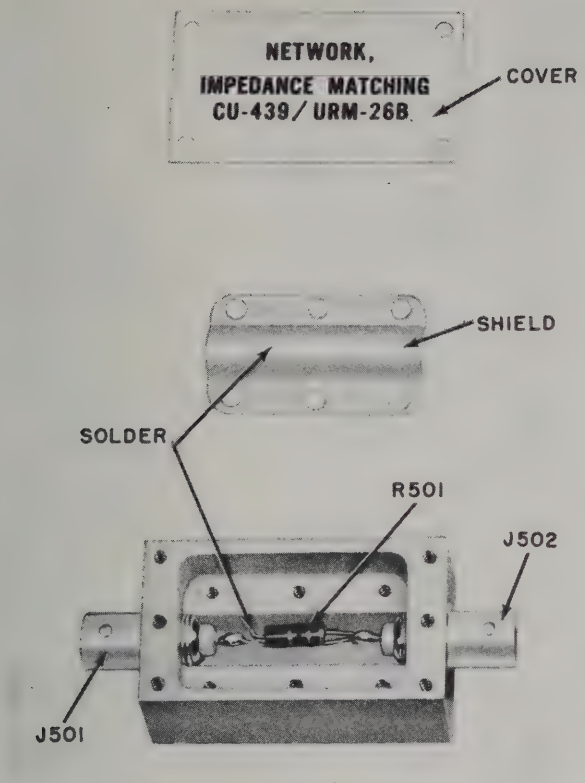


Figure 6-13. Interior View of Impedance Matching Network CU-439/URM-26B.

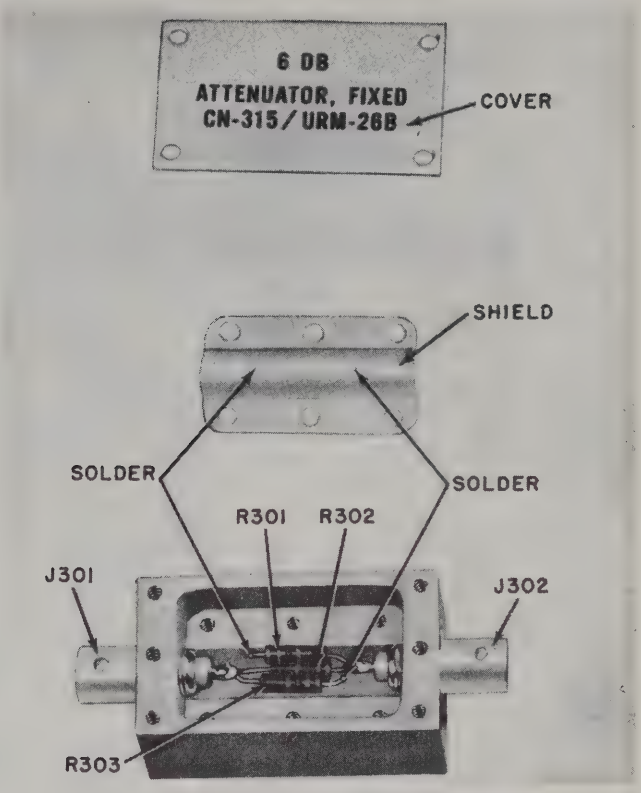


Figure 6-14. Interior View of (2:1) Fixed Attenuator CN-315/URM-26B.

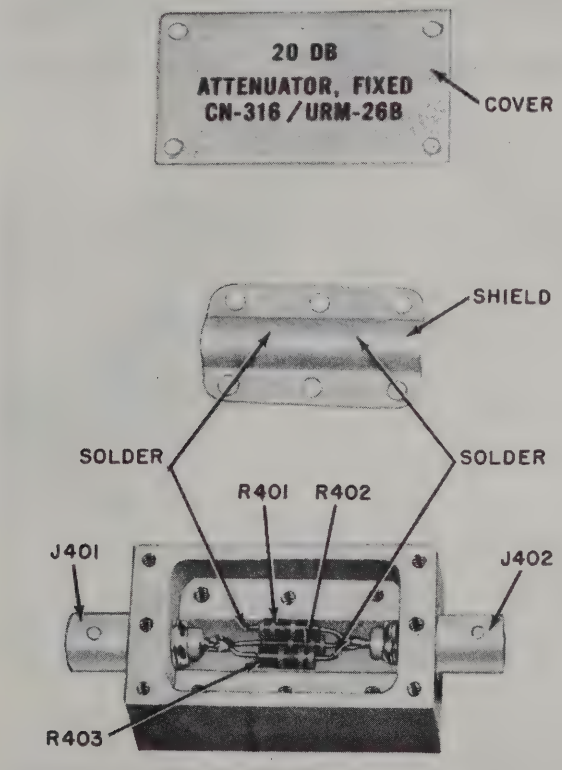
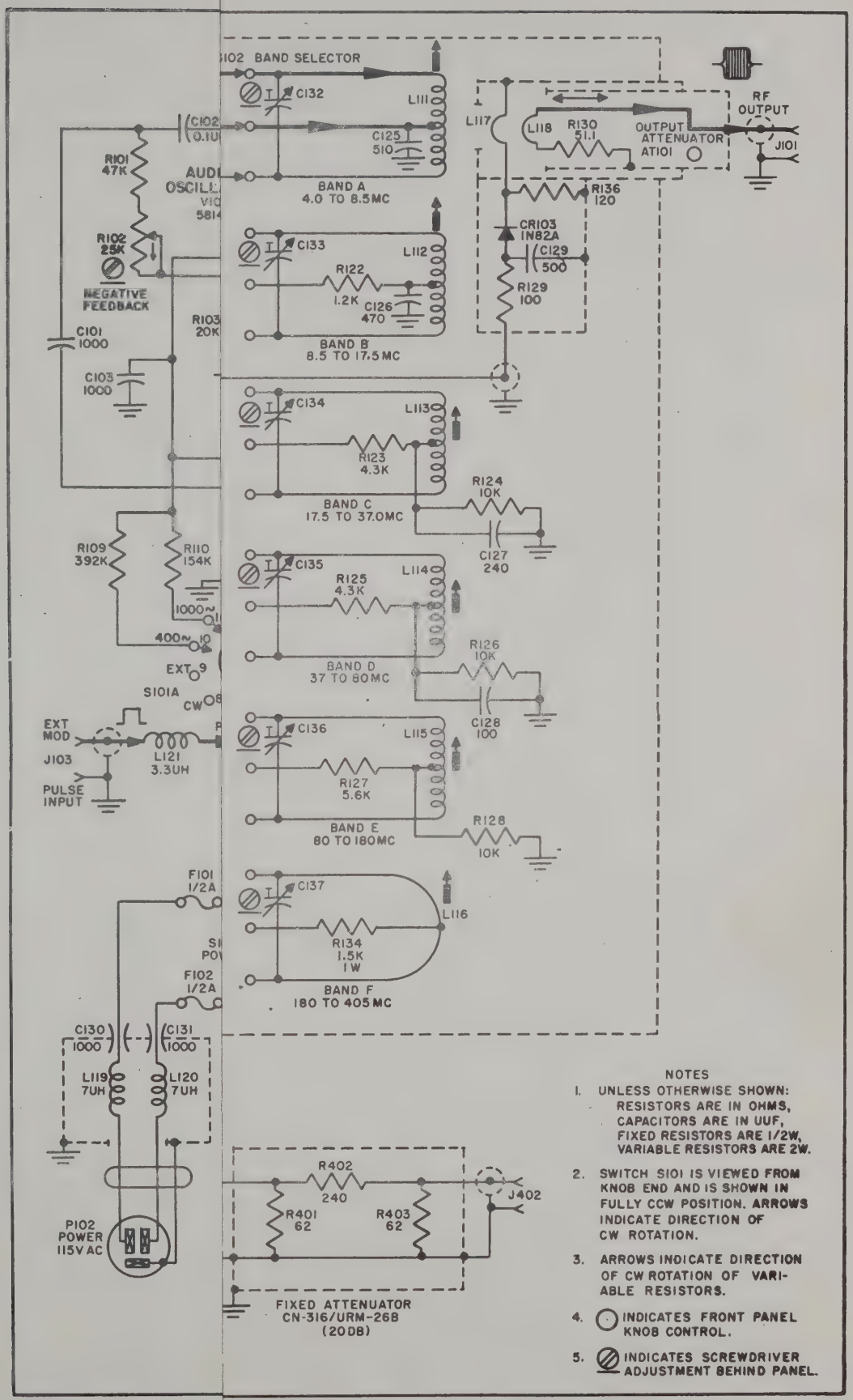


Figure 6-15. Interior View of (10:1) Fixed Attenuator CN-316/URM-26B.



l Generator AN/URM-26B, Overall Schematic.

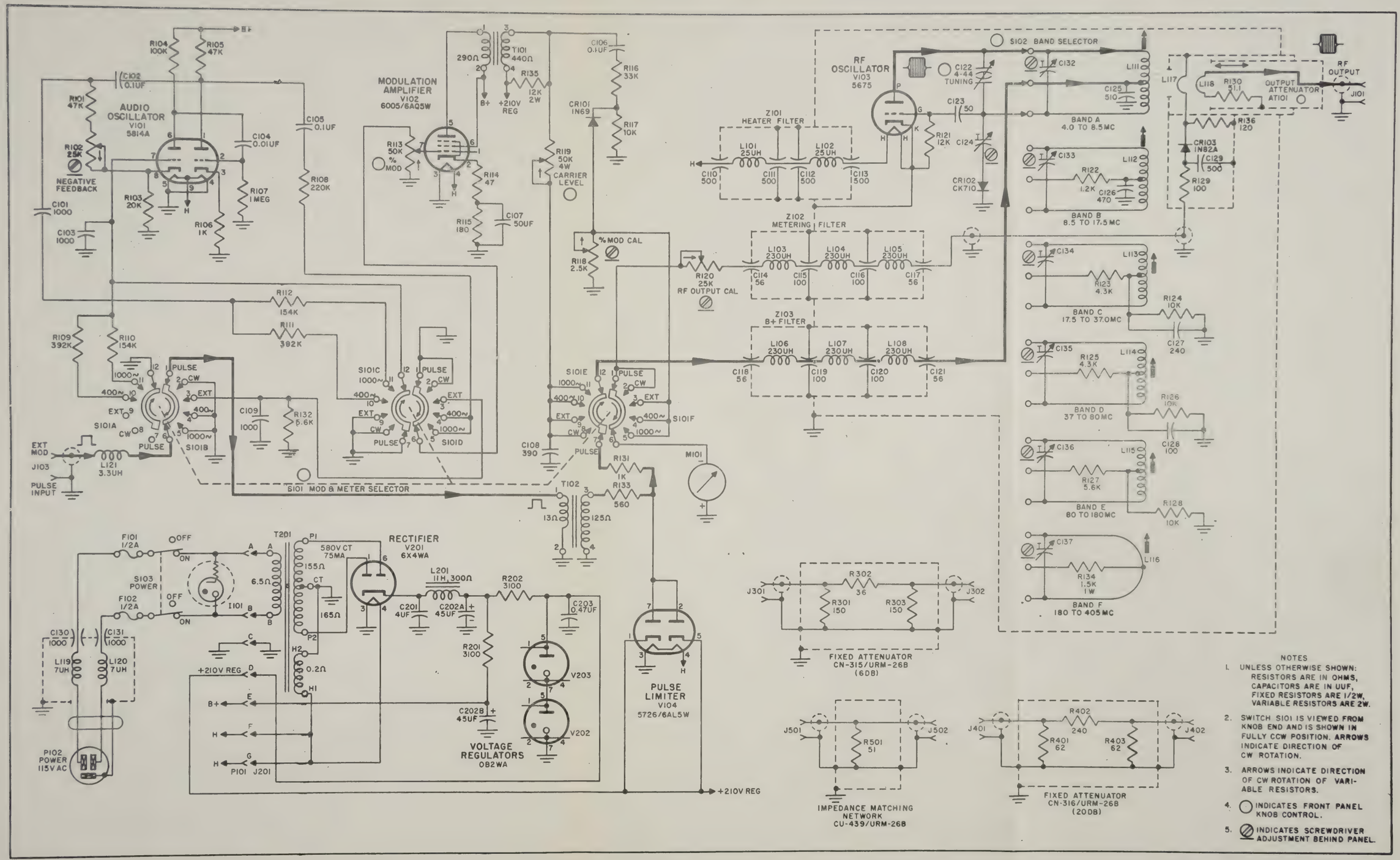


Figure 6-16. RF Signal Generator AN/URM-26B, Overall Schematic.

SECTION 7

PARTS LIST

7-1. INTRODUCTION.

Reference designations have been assigned to identify all maintenance parts of the equipment. They are used for marking the equipment (adjacent to the part they identify) and are included on drawings, diagrams and the parts list. The *letters* of a reference designation indicate the kind of part (generic group), such as resistor, amplifier, electron tube, etc. The *number* differentiates between parts of the same generic group. Parts of the same first major unit (signal generator) are numbered from 1 to 199; parts of the second unit (power supply) 201 to 299, etc. Sockets associated with a particular plug-in device, such as an electron tube or a fuse, are identified by a reference designation which includes the reference designation of the plug-in device. For example, the socket for electron tube V101 is designated XV101.

7-2. MAINTENANCE PARTS LIST.

Table 7-1 lists all major units and their maintenance parts. The parts of each major unit are grouped together. Column 1 lists the reference series of each major unit, followed by the reference designations of the various parts in alphabetical and numerical order. Column 2 refers to the explanatory notes that appear in paragraph 7-6 below. Column 3 gives the name and describes the various parts. Complete information is given for all key parts (parts differing from any part previously listed in this table) and sub-key parts (parts identical with a key part but appearing for the first time for a major unit). The name and description are omitted for other parts. However, reference is made to the key part or sub-key part for the data. Column 4 indicates how the part is used and gives its functional location in the equipment. It also includes the figure number of the pictorial illustration on which the part is identified.

7-3. STOCK NUMBER IDENTIFICATION.

Table 7-2 is arranged by key designation. The "Stock Number" column gives stock numbers for the various key parts. Therefore, if you have a reference designation for a part, find its key designation from table 7-1 before using this table. Stock numbers preceded by an asterisk (*) apply to replacement items which differ from the items initially supplied in the equipment.

7-4. STOCK NUMBER CROSS REFERENCE.

Table 7-3 lists by stock numbers all key parts that have been assigned stock numbers. If the stock number of a part used in the equipment is known this table can be used to locate the description of the part in table 7-1.

7-5. LIST OF MANUFACTURERS.

Table 7-4 lists manufacturers of parts used in the equipment. The first column includes the abbreviations used in table 7-1 to identify manufacturers.

7-6. NOTES.

The following provide additional information about items listed in table 7-1.

(1) Fabricate locally from bulk material having the stock number listed in table 7-2.

(2) Assemble from component parts.

(3) Low failure item – if required requisition from ESO referencing NAVSHIPS 900, 180A.

(4) Non-replaceable in this application. Listed for reference only.

(5) Replace by adapting or modifying the standard item having the stock numbers listed in table 7-2. Modify as indicated in the description.

(6) Replace with the substitute part having the stock number listed in table 7-2.

(7) Reliable tube cannot be used in this application. When requesting replacement, specify "no substitute acceptable".

TABLE 7-1. RF SIGNAL GENERATOR SET AN/URM-26B, MAINTENANCE PARTS LIST

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
SIGNAL GENERATOR SG-117/URM-26B			
101-199		GENERATOR, SIGNAL SG-117/URM-26B	
AT101	2	ATTENUATOR, Output, for reference only	Output attenuator, Figure 6-6.
C101		CAPACITOR, fixed: mica dielectric, 1000 uuf ±2% 500V, CM25D102G	Audio oscillator feedback time constant capacitor, Figure 5-3.
C102		CAPACITOR, fixed: paper dielectric, 0.1 uf ±20%, 400V, CN43EE104M	Audio oscillator feedback coupling capacitor, Figure 5-3.
C103		Same as C101	Audio oscillator grid time constant capacitor, Figure 5-3.
C104		CAPACITOR, fixed; paper dielectric, 0.01 uf ±20%, 300V, CN22AX103M	V101A output coupling capacitor, Figure 5-3.
C105		Same as C102	Audio oscillator output coupling capacitor, Figure 5-3.
C106		Same as C102	Modulation metering coupling capacitor Figure 5-3.
C107	6	CAPACITOR, fixed: electrolytic, 50 uf, 50V, CMA type TCX-550	V102 cathode bypass capacitor, Figure 5-3.
C108	6	CAPACITOR, fixed: mica dielectric, 390 uuf ±10%, 300V, CM15B391K	Modulator output RF bypass capacitor, Figure 6-8.
C109	6	CAPACITOR, fixed: mica dielectric, 1000 uuf ±10%, 500V, CM25B102K	External modulation input RF bypass capacitor, Figure 6-8.
C110		CAPACITOR, fixed: button style, mica dielectric, 500 uuf ±10%, 500V, CAN type M-100 or CER type 370 BH	p/o Z101, Figure 6-3.
C111		Same as C110	p/o Z101, Figure 6-3.
C112		Same as C110	p/o Z101, Figure 6-3.
C113		Same as C110	p/o Z101, Figure 6-3.
C114		CAPACITOR, fixed: button style, mica dielectric, 56 uuf ±10%, 500V, CAN type M-100 or CER type 370 BH	p/o Z102, Figure 6-3.
C115		CAPACITOR, fixed: button style, mica dielectric, 100 uuf ±10%, 500V, CAN type M-100 or CER type 370 BH	p/o Z102, Figure 6-3.
C116		Same as C115	p/o Z102, Figure 6-3.
C117		Same as C114	p/o Z102, Figure 6-3.
C118		Same as C114	p/o Z103, Figure 6-3.
C119		Same as C115	p/o Z103, Figure 6-3.
C120		Same as C115	p/o Z103, Figure 6-3.
C121		Same as C114	p/o Z103, Figure 6-3.
C122		CAPACITOR, variable: air dielectric, 4-44 uuf, split stator type, incl C123 and C124, Trad Part No.118-D-154	Main tuning capacitor, Figure 6-5.
C123	4	CAPACITOR, fixed: mica dielectric, for reference only	V103 grid coupling capacitor, Figure 6-5.

TABLE 7-1. (Continued)

SIGNAL GENERATOR SG-117/URM-26B

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C124	4	CAPACITOR, variable: air dielectric, for reference only	Anti-FM trimmer capacitor, Figure 6-5.
C125	6	CAPACITOR, fixed: mica dielectric, 510 uuf ±5%, 300V, CM15C511J	Band A, RF tank bypass capacitor, Figure 6-4B.
C126	6	CAPACITOR, fixed: mica dielectric, 470 uuf ±5%, 300V, CM15C471J	Band B, RF tank bypass capacitor, Figure 6-4B.
C127	6	CAPACITOR, fixed: mica dielectric, 240 uuf ±5%, 300V, CM15C241J	Band C, RF tank bypass capacitor, Figure 6-4B.
C128		CAPACITOR, fixed: mica dielectric, 100 uuf ±5%, 300V, CM15C101J	Band D, RF tank bypass capacitor, Figure 6-4B.
C129		CAPACITOR, fixed: button style, mica dielectric, 500 uuf ±10%, 500V, CAN type M-62 or CER type 370 CF	RF voltmeter metering RF filter capacitor, Figure 5-7.
C130	6	CAPACITOR, fixed: ceramic dielectric, HI-K, feedthrough type, 1000 uuf, 500V, power factor 2.5%, CER type 327	AC input power line RF filter capacitor, Figure 5-1.
C131		Same as C130	AC input power line RF filter capacitor, Figure 5-1.
C132	3	CAPACITOR, variable: air dielectric trimmer, c/o two trapezoidal shape silver plated brass plates, each 0.015 in. thick, 7-16 in. lg, ¼ in. wd at one end, 5/32 in. diam at other end, one 0.093 in. diam hole at small end	Band A Trimmer Figure 6-4B.
C133		Same as C132	Band B Trimmer Figure 6-4B.
C134		Same as C132	Band C Trimmer Figure 6-4B.
C135		Same as C132	Band D Trimmer Figure 6-4B.
C136		Same as C132	Band E Trimmer Figure 6-4B.
C137		Same as C132	Band F Trimmer Figure 6-4B.
CR101		CRYSTAL UNIT, rectifying: Type 1N69 per MIL-E-1	M101 % modulation rectifier, Figure 5-3.
CR102		CRYSTAL UNIT, rectifying: CRP No. CK710	FM compensator crystal, Figure 6-5.
CR103		CRYSTAL UNIT, rectifying: CALG Type 1N82A (glass)	M101 RF voltmeter rectifier, Figure 5-7.
E101	6	SHIELD, electron tube: TS103U02 per JAN-S-28A	Shield for V101 Figure 6-3.
E102	6	SHIELD, electron tube: TS102U03 per JAN-S-28A	Shield for V102 Figure 6-3.
E103		Ref. desig. cancelled	
E104	6	SHIELD, electron tube: TS102U01 per JAN-S-28A	Shield for V104 Figure 6-5.
E105	3	KNOB: per Air Force Drawing 47A40527, for reference only	Front panel control knob, Figure 6-1.

TABLE 7-1. (Continued)

SIGNAL GENERATOR SG-117/URM-26B

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
E106		Same asE105	Front panel control knob, Figure 6-1.
E107		Same as E105	Front panel control knob, Figure 6-1.
E108	3	KNOB: Trad Part No. 107-B-727, for reference only	Band Selector control knob, Figure 6-1.
E109		POST, binding: screw type, CABU Type DF30BC	Front panel ground post, Figure 6-1.
E110		Ref. Desig. Cancelled	
E111	3	CRYSTAL MOUNT: Trad Part No. 118-B-98, for reference only	Holder for CR103, R129, C129, Figure 5-7.
E112	3	PISTON SLEEVE: Trad Part No. 118-B-59, for reference only	p/o AT101, Figure 6-6.
E113	3	PISTON RACK: Trad Part No. 118-B-89, for reference only	p/o AT101, Figure 6-6.
E114	3	PISTON: Trad Part No. 118-B-82, for reference only	p/o AT101, Figure 6-6.
E115	3	GROUNDING BUSHING: Trad Part No. 118-B-57, for reference only	p/o AT101, Figure 6-6.
E116		CLAMP, cable: strain relief, AN3057-8	Strain relief for power cable, Figure 6-1.
F101		FUSE: cartridge, Type F02GR500B per MIL-F-15160, MS90078	AC Line fuse, Figure 6-1.
F102		Same as F101	AC Line fuse, Figure 6-1.
F103		Same as F101	Spare fuse
F104		Same as F101	Spare fuse
H101	3	SCREW, captive: Trad Part No. 107-A-214	Secures signal generator to case Figure 6-1.
I101		LAMP, neon: 105-125V, 1/25W, type T-3-1/4, clear, miniature bayonet base, CG type NE-51	Power ON-OFF indicator, Figure 6-1.
J101		CONNECTOR, receptacle: Type UG-291B/U, per Navy Dwg REB49067	RF OUTPUT jack, Figure 6-1.
J102		Ref. Desig. cancelled	
J103		CONNECTOR, receptacle: Type UG-1094/U per MS35179 (SigC)	EXT MOD-PULSE INPUT jack, Figure 6-1.
L101		COIL, filter: 25 uh ±10%, five layer winding, solenoid wound, phenolic form, 0.355 ohms ±10% dc resistance, Trad Part No. 102-B-726	p/o Z101, Figure 6-3.
L102		Same as L101	p/o Z101, Figure 6-3.
L103		COIL, filter: 230 uh ±10%, single winding, single pie universal wound, phenolic form, Trad Part No.118-B-153	p/o Z102, Figure 6-3.
L104		Same as L103	p/o Z102, Figure 6-3.
L105		Same as L103	p/o Z102, Figure 6-3.
L106		Same as L103	p/o Z103, Figure 6-3.
L107		Same as L103	p/o Z103, Figure 6-3.
L108		Same as L103	p/o Z103, Figure 6-3.
L109		Ref. Desig. cancelled	
L110		Ref. Desig. cancelled	

TABLE 7-1. (Continued)

SIGNAL GENERATOR SG-117/URM-26B

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
L111		COIL, RF: oscillator, 32.6 uh, single winding, single pie universal wound, tapped, ceramic form, adjustable powdered iron core, Trad Part No. 118-B-36	Oscillator coil, Band A, Figure 6-4A.
L112		COIL, RF: oscillator, 7.29 uh, single winding, single pie universal wound, tapped, ceramic form, adjustable powdered iron core, Trad Part No. 118-B-38	Oscillator coil, Band B, Figure 6-4A.
L113		COIL, RF: oscillator, 1.80 uh, single winding, solenoid wound, tapped, ceramic form, adjustable powdered iron core, Trad Part No. 118-B-42	Oscillator coil, Band C, Figure 6-4A.
L114		COIL, RF: oscillator, 0.403 uh, single winding, solenoid wound, tapped, ceramic form, adjustable powdered iron core, Trad Part No. 118-B-43	Oscillator coil, Band D, Figure 6-4A.
L115		COIL, RF: oscillator, 0.0879 uh, single winding, solenoid wound, tapped, ceramic form, adjustable powdered iron core, Trad Part No. 118-B-44	Oscillator coil, Band E, Figure 6-4A.
L116		COIL, RF: oscillator, inductance not measurable, silver plated copper band bent to special shape, Trad Part No. 118-B-45	Oscillator coil, Band F, Figure 6-4A.
L117	2	INDUCTOR, RF: tinned copper wire, No. 22 AWG, 1-1/8 in. lg	Metering RF pickup coil, Figure 5-7.
L118	3	INDUCTOR, RF: inductance not measurable, silver plated copper strip bent to special shape, Trad Part No. 118-B-85	Output RF pickup coil, Figure 6-6.
L119		COIL, RF: choke, 7.0 uh ±10%, single winding, single layer wound, 0.95 ohms ±10% dc resistance, 1 amp, phenolic core, COM No. Z-50	Line filter coil, Figure 5-1.
L120		Same as L119	Line filter coil, Figure 5-1.
L121		CHOKE, RF: 3.3 uh ±10%, LT8K003	J103 filter choke, Figure 6-3.
M101		METER, multiscale: dc, 0 to 100 micro-amperes range, hermetically sealed round metal flush mounted case, Trad Part No. 118-B-132	RF output and % modulation meter, Figure 6-1.
N101		DIAL, attenuator adjusting: aluminum dial with molded plastic knob, 2-3/4 in. diam, calibrated in two scales, microvolts scale from .1 to 100K, (−) dbm scale from 6 to 128, Trad Part No. 118-B-159	Front panel dial for AT101, Figure 6-1.
N102	3	DIAL, frequency tuning: aluminum dial with bakelite knob, 1-3/4 in. diam, calibrated in 100 equally spaced divisions, marked 0 to 90, Trad Part No. 107-B-671	Frequency tuning dial, Figure 6-1.
N103		DIAL, frequency scale: flat circular brass gear with frequency scale on one surface, calibrated in six frequency ranges covering 320 degrees, outer scale in linear divisions from 0 to 1000, Trad Part No. 118-C-106	Frequency scale, Figure 6-5.
N104		DIAL MASK: black amodized aluminum disk, 5.390 in. diam, six slots for viewing frequency scales, Trad Part No. 118-B-112	Frequency scale mask, Figure 6-5.
N105	3	SCALE, vernier: for reference only, Trad Part No. 107-B-124	Vernier for tuning dial (N102) Figure 6-1.
N106	3	INDEX, attenuator dial: for reference only, Trad Part No. 118-A-115	Index for attenuator dial (N101), Figure 6-1.

TABLE 7-1. (Continued)

SIGNAL GENERATOR SG-117/URM-26B

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
N107	3	INDEX, frequency scale: for reference only, Trad Part No. 118-B-119	Index for frequency scale (N103) Figure 6-5.
O101		GEAR ASSY: anti-backlash type, two brass gears on common hub with two coil springs connecting gears, 4 in. PD, Trad Part No. 118-B-108	Drive gear for C122 Figure 6-3.
O102		GEAR ASSY: two concentric gears mounted on common hub, one gear 5.960 PD, other gear 3.000 PD, Trad Part No. 118-C-102	Anti-backlash gear for frequency scale (N103) and driving gear for gear assy (O101) Figure 6-3.
O103		GEAR, spur: brass, 0.541 PD, 9/16 in. lg o/a, Trad Part No. 118-B-51	Driving gear for frequency scale (N103) Figure 6-3.
O104		GEAR, spur: brass, 1.000 PD, 5/8 in. lg o/a, Trad Part 118-B-92	Driving gear for attenuator AT101 Figure 6-3.
O105		GEAR, miter: brass, 0.750 PD, 45 deg pitch angle, 0.390 in. lg o/a, Trad Part No. 118-A-160	Driving gear for oscillator coil turret assy Figure 6-3.
O106		Same as O105	Driving gear for oscillator coil turret assy Figure 6-3.
P101		CONNECTOR, plug: 7 round polarized female contacts, Type AN3106A-16S-1S	Connects signal generator to power supply, Figure 6-3.
P102		CONNECTOR, plug: two flat blade contacts and one grounding contact, Type UP121M per MS91185, MIL-C-3767	Power cord plug, Figure 6-1.
R101	6	RESISTOR, fixed: composition, 47K ±10%, ½W, RC20GF473K	Audio oscillator negative feedback resistor, Figure 5-3.
R102		RESISTOR, variable: composition, 25K ±10%, 2W, linear curve U, no switch, CBZ No. JLU-2531SD4040L	Audio oscillator degenerative feedback control, Figure 5-3.
R103		RESISTOR, fixed: composition, 20K ±5%, ½W, RC20GF203J	V101A cathode bias and negative feedback resistor, Figure 5-3.
R104	6	RESISTOR, fixed: composition, 100K ±10%, ½W, RC20GF104K	V101A plate load resistor, Figure 5-3.
R105		Same as R101	V101B plate load resistor, Figure 5-3.
R106	6	RESISTOR, fixed: composition 1K ±10%, ½W, RC20GF102K	V101B cathode bias and degeneration resistor, Figure 5-3.
R107	6	RESISTOR, fixed: composition, 1 megohm ±10%, ½W, RC20GF105K	V101B grid leak resistor, Figure 5-3.
R108	6	RESISTOR, fixed: composition, 220K ±10%, ½W, RC20GF224K	Audio oscillator load isolating resistor, Figure 5-3.
R109	6	RESISTOR, fixed: film, 392K ±1%, 1/2W, RN70B3923F	Audio oscillator 400 cps grid leak, Figure 5-3.
R110	6	RESISTOR, fixed: film, 154K ±1%, 1/2W, RN70B1543F	Audio oscillator 1000 cps grid leak, Figure 5-3.

TABLE 7-1. (Continued)

SIGNAL GENERATOR SG-117/URM-26B

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R111		Same as R109	Audio oscillator 400 cps feedback resistor, Figure 5-3.
R112		Same as R110	Audio oscillator 1000 cps feedback resistor, Figure 5-3.
R113	6	RESISTOR, variable: composition, 50K ±10%, 2W, RV4ATRD503A	% MODULATION control Figure 5-3.
R114		RESISTOR, fixed: composition, 47 ohms ±5%, ½W, RC20GF470J	V102 cathode bias and degeneration resistor, Figure 5-3.
R115		RESISTOR, fixed: composition, 180 ohms ±5%, ½W, RC20GF181J	V102 cathode bias resistor, Figure 5-3.
R116	6	RESISTOR, fixed: composition, 33K ±10%, ½W, RC20GF333K	% modulation voltage dropping resistor, Figure 5-3.
R117	6	RESISTOR, fixed; composition, 10K ±10%, ½W, RC20GF103K	% modulation voltage divider resistor, Figure 5-3.
R118		RESISTOR, variable: composition, 2.5K ±10%, 2W, linear curve U, no switch, CBZ No. JLU-2521SD4040L	% MOD CAL control, Figure 5-3.
R119		RESISTOR, variable: wire wound, 50K ±10%, 4W, RA30A1RD503AK	CARRIER LEVEL control, Figure 5-3.
R120		Same as R102	RF OUTPUT CAL control, Figure 5-3.
R121		RESISTOR, fixed: composition, 12K ±5%, 1/2W, RC20GF123J	V103 grid leak resistor, Figure 6-5.
R122	6	RESISTOR, fixed: composition, 1.2K ±10%, ½W, RC20GF122K	Band B B+ isolating resistor, Figure 6-4B.
R123		REISTOR, fixed: composition, 4.3K ±5%, ½W, RC20GF432J	Band C B+ isolating resistor, Figure 6-4B.
R124		RESISTOR, fixed: composition, 10K ±5%, ½W, RC20GF103J	Band C plate voltage divider, Figure 6-4B.
R125		Same as R123	Band D B+ isolating resistor, Figure 6-4B.
R126		Same as R124	Band D plate voltage divider, Figure 6-4B.
R127		RESISTOR, fixed: composition, 5.6K ±5%, ½W, RC20GF562J	Band E B+ isolating resistor, Figure 6-4B.
R128		Same as R124	Band E plate voltage divider, Figure 6-4B.
R129	6	RESISTOR, fixed: composition, 100 ohms ±10%, ½W, RC20GF101K	RF voltmeter series dropping resistor, Figure 5-7.
R130		RESISTOR, fixed: film, 51.1 ohms ±1%, 1/8W, RN60B51R1F	RF output termination resistor, Figure 6-6.
R131		Same as R106	Pulse limiter isolation resistor, Figure 5-3.
R132	6	RESISTOR, fixed: composition, 5.6K ±10%, ½W, RC20GF562K	External modulation input load resistor, Figure 6-8.
R133	6	RESISTOR, fixed: composition, 560 ohms ±10%, ½W, RC20GF561K	Pulse transformer isolating resistor, Figure 5-3.

TABLE 7-1. (Continued)

SIGNAL GENERATOR SG-117/URM-26B

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
R134		RESISTOR, fixed: composition, 1.5K ±5%, 1W, RC32GF152J	Band F B+ isolating resistor, Figure 6-4A.
R135		RESISTOR, fixed: composition, 12K ±10%, 2W, RC42GF123K	T101 load matching resistor, Figure 5-5.
R136		RESISTOR, fixed: composition, 120 ohms ±5%, 1/2W, RC20GF121J	Damping resistor for CR103.
S101		SWITCH, rotary: 4 sections, 5 positions, 2 poles per section on 3 sections, 2 stator contacts on 1 section, Trad Part No. 107-B-647	MOD & METER SELECTOR, Figure 6-7.
S102	4	SWITCH, For reference only	BAND SELECTOR, Figure 6-1.
S103		SWITCH, toggle: DPST, Type ST22K	POWER ON-OFF Switch, Figure 6-1.
T101		TRANSFORMER, modulation: 1:1 turns ratio, pri 35 ma dc, sec 5-25 ma dc, pri 180 v dc, sec 210 vdc, Trad Part No. 118-B-148	Modulation transformer, Figure 6-3.
T102		TRANSFORMER, pulse: 70 ohms source impedance, 10,000 ohms load impedance, 1:5 step-up ratio, 1 to 40 usec pulse length, less than 0.1 usec rise time, 50 to 5000 pulse repetitions per second, 40v peak source amplitude, Trad Part No. 118-B-149	Pulse transformer, Figure 6-3.
TB101	3	BOARD, terminal: Trad Part No. 118-B-138	Audio and metering terminal board, Figure 5-4.
V101		ELECTRON TUBE: Type 5814A	Audio oscillator, Figure 6-3.
V102		ELECTRON TUBE: Type 6005/6AQ5W	Modulation amplifier, Figure 6-3.
V103		ELECTRON TUBE: Type 5675	RF oscillator, Figure 6-5.
V104		ELECTRON TUBE: Type 5726/6AL5W	Pulse limiter, Figure 6-3.
W101	2	CORD ASSY, power: Trad Part No. 124-B-25	AC line cord Figure 6-1.
W101A		CORD, power, bulk: 3 conductor, No. 18 AWG, stranded, insulated, Cornish type SJ	p/o W101
XF 101		FUSEHOLDER: CFA No. HKP-HRWEJ	Fuseholder for F101, Figure 6-3.
XF102		Same as XF101	Fuseholder for F102, Figure 6-3.
XI101		LAMPHOLDER, neon: w/lens, black nickel pl, LH64P02 per MIL-L-3661, MS90287	Holder for I101, Figure 6-3.
XV101		SOCKET, electron tube: Type TS103P01	Socket for V101, Figure 6-8.
XV102	6	SOCKET, electron tube: Type TS102P01	Socket for V102, Figure 6-8.
XV103		SOCKET, electron tube: pencil tube type, CMG No.54A-16325	Socket for V103 filament, Figure 6-5.
XV104		Same as XV102	Socket for V104, Figure 6-8.
Z101		FILTER, heater: c/o capacitors C110, 111, 112, 113 and coils L101, 102, enclosed in cylindrical silver plated brass body, Trad Part No. 102-B-801	Heater filter for V103, Figure 6-3.

TABLE 7-1. (Continued)

SIGNAL GENERATOR SG-117/URM-26B

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
Z102		FILTER, metering: c/o capacitors C114, 115, 116, 117 and coils L103, 104, 105, mounted in cylindrical silver plated brass body, Trad Part No. 118-B-156	Metering filter for V103, Figure 6-3.
Z103		Same as Z102	B+filter for V103, Figure 6-3.
POWER SUPPLY PP-1215/URM-26B			
201-299		POWER SUPPLY PP-1215/URM-26B	
C201	6	CAPACITOR, fixed: paper dielectric 4 uf ±10%, 600V, CP40C2DF405K	Input filter, Figure 6-11.
C202		CAPACITOR, fixed: electrolytic, dual, 2x45 uf, 350V, CE52C450P	Output filter, Figure 6-11.
C203		CAPACITOR, fixed: paper dielectric, 0.47 uf ±10%, 400V, CP11A3EE474K	Regulator filter, Figure 6-11.
E201	6	SHIELD, electron tube: TS102U03, same as E102	Shield for V201, Figure 6-11.
E202		Same as E201	Shield for V202 Figure 6-11.
E203		Same as E201	Shield for V203, Figure 6-11.
J201	6	CONNECTOR, receptacle: 7 round polarized male contacts, Type AN3102A-16S-1P	Connects signal generator to power supply, Figure 6-11.
L201		CHOKE, filter: 11h ± 10%, 75 ma, 400 ohms max dc resistance, 750v RMS test, hermetically sealed metal case, Trad Part No. 107-B-310	Filter choke, Figure 6-11.
R201		RESISTOR, fixed: wire wound, 3100 ohms ±5%, 22W, RW21G312	Isolating, voltage-dropping resistor, Figure 6-12.
R202		Same as R201	Regulator resistor, Figure 6-12.
T201		TRANSFORMER, power: filament and plate type, input 115V, 50 to 1000 cps, two output windings, sec. No. 1-6.5V at 2.8 amp, sec No. 2-580V at 75 ma, working voltage to ground: pri 165v, RMS test 500V, sec No. 1 10V, RMS test 500V, sec No. 2 406V, RMS test 1160V, Trad Part No. 118-B-152	Power transformer, Figure 6-12.
V201		ELECTRON TUBE: Type 6X4WA	Rectifier Figure 6-11.
V202		ELECTRON TUBE: Type 0B2WA	Voltage regulator Figure 6-11.
V203		Same as V202	Voltage regulator Figure 6-11.
XC202	6	SOCKET, electron tube: Type TS101P02	Socket for C202, Figure 6-12.
XV201		SOCKET, electron tube: Type TS102P01, same as XV102	Socket for V201, Figure 6-12.
XV202		Same as XV201	Socket for V202, Figure 6-12.
XV203		Same as XV201	Socket for V203, Figure 6-12.

TABLE 7-1. (Continued)

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
ACCESSORIES			
301-799		ACCESSORIES	
J301		CONNECTOR, receptacle: Type UG-1094/U per MS35179 (SigC), same as J103	p/o Z301, Figure 6-14.
J302 (Cont., see J401)		Same as J301	p/o Z301, Figure 6-14.
R301		RESISTOR, fixed: composition, 150 ohms ±5%, ½W, RC20GF151J	p/o Z301, Figure 6-14.
R302		RESISTOR, fixed: composition, 36 ohms ±5%, ½W, RC20GF360J	p/o Z301, Figure 6-14.
R303 (Cont., see R401)		Same as R301	p/o Z301, Figure 6-14.
Z301 (Cont., see Z401)		ATTENUATOR, fixed: 6db, CN-315/URM-26B, Trad Part No. 118-C-10	6db attenuator, Figure 6-14.
J401		Same as J301	p/o Z401, Figure 6-15.
J402 (Cont., see J501)		Same as J301	p/o Z401, Figure 6-15.
R401		RESISTOR, fixed: composition, 62 ohms ±5%, ½W, RC20GF620J	p/o Z401, Figure 6-15.
R402		RESISTOR, fixed: composition, 240 ohms ±5%, ½W, RC20GF241J	p/o Z401, Figure 6-15.
R403 (Cont., see R501)		Same as R401	p/o Z401, Figure 6-15.
Z401 (Cont., see Z501)		ATTENUATOR, fixed: 20db, CN-316/URM-26B, Trad Part No. 118-C-9	20db attenuator, Figure 6-15.
J501		Same as J301	p/o Z501, Figure 6-13.
J502		Same as J301	p/o Z501, Figure 6-13.
R501		RESISTOR, fixed: composition, 51 ohms ±5%, ½W, RC20GF510J	p/o Z501, Figure 6-13.
Z501		NETWORK, impedance matching: CU-439/URM-26B, Trad Part No. 118-C-11	Impedance matching network, Figure 6-13.
W601	2	CABLE ASSY, RF: type RG-58C/U cable with one type UG-88/U connector at each end, 4 ft 1 in. lg o/a, Trad Part No. 118-B-6	RF CORD (4′ 1″) Figure 1-1.
W601A	6	CONNECTOR, plug: Type UG-88/U	p/o W601
W601B	6	RF CABLE, bulk: Type RG-58C/U	p/o W601
W701	2	CABLE ASSY, RF: type RG-58C/U cable with one type UG-88/U connector at each end, 7 in. lg o/a, Trad Part No. 118-B-7	RF CORD (7″) Figure 1-1.
W701A		Same as W601A	p/o W701
W701B		Same as W601B	p/o W701

TABLE 7-2. RF SIGNAL GENERATOR SET AN/URM-26B, STOCK NUMBER IDENTIFICATION.

REF. DESIG.	STOCK NUMBERS			
	FEDERAL	STANDARD NAVY	SIGNAL CORPS	USAF
C101	N5910-114-2431			
C102	N5910-270-5350			3330-056550023
C104	N5910-112-7451		5910-668-0584	3330-056550033
C107	*N5910-643-9303			3330-
C108	*N5910-284-4046		5910-666-8856	3330-
C109	*N5910-114-2430		5910-100-8125	3330-376050000
C110	N5910-668-9337			3330-
C114				
C115	N5910-668-9336			
C122				3330-
C125	*N5910-280-7185		5910-667-2329	3330-056200546
C126	*N5910-280-9570			3330-
C127	*N5910-644-0634		5910-636-2105	3330-
C129				3330-
C130	*N5910-643-8981		5910-280-8371	3330-055475140
C201	*N5910-120-1675		5910-174-9953	3330-
C202	N5910-666-7701			3330-
C203	N5910-644-0600			3330-056750768
CR101	N5960-194-9408			5960-
CR102	N5960-390-5226			5960-
CR103	N5960-669-6876			5960-
E101	*N5960-264-3004			5960-264-3004
E102	*N5960-669-8808		5960-296-4072	5960-272-9092
E104	*N5960-262-0015			5960-262-0015
E105			5355-284-5670	3320-292241388
E108				3320-
E109	N5935-502-4717		5940-549-2784	8880-118600-6755
E111				
E112				7CAA-
E113				7CAA-
E114				7CAA-
E115				7CAA-
E116	N5935-258-0604			8850-100915
F101	N5920-665-0976		5920-199-9498	8870-185500-255
H101				7CAA-
I101	GF6240-223-9100			8870-696000-725
J101	N5935-201-5983			8850-

TABLE 7-2. (Continued)

REF. DESIG.	STOCK NUMBERS			
	FEDERAL	STANDARD NAVY	SIGNAL CORPS	USAF
J103	N5935-258-9768		5935-642-1003	8850-479737
J201	*N5935-149-3466		5935-149-3466	8850-560158-52
L101	N5950-504-8878			
L103	N5950-518-0246			
L111	N5950-538-6325			3340-
L112	N5950-538-6324			3340-
L113	N5950-538-6326			3340-
L114	N5950-538-6323			3340-
L115	N5950-538-6340			3340-
L116	N5950-518-3363			3340-
L118				3340-
L119	N5950-246-4380			3340-060081580
L121	N5999-501-7400			3340-
L201	N5950-647-6603			3340-
M101	N6625-649-2050			7CAC-
N101	N5355-518-0882			3320-
N102				3320-
N103	N5355-538-6329			3320-
N104	N5355-504-9991			
N105				
N106				
N107				
O 101	N3020-520-6618			7CAA-
O 102	N3020-520-6617			7CAA-
O 103	N3020-528-0583			7CAA-
O 104	N3020-528-0584			7CAA-
O 105	N3020-528-0585			7CAA-
P101	N5935-259-2748			8850-310593-52
P102	N5935-636-7145			8850-
R101	*N5905-254-9201		5905-295-3410	
R102	N5905-108-9718			
R103	N5905-192-0649			
R104	*N5905-195-6761		5905-192-3987	
R106	*N5905-195-6806		5905-195-6817	3350-098000-3331
R107	*N5905-192-0390		5905-192-3982	
R108	*N5905-192-0667		5905-644-9502	
R109	*N5905-642-1099			3350-
R110	*N5905-279-4991			3350-
R113	*N5905-259-6294		5905-174-4801	

TABLE 7-2. (Continued)

REF. DESIG.	STOCK NUMBERS			
	FEDERAL	STANDARD NAVY	SIGNAL CORPS	USAF
R114	N5905-252-4018			3350-098000-1851
R115	N5905-279-3514			3350-098000-2511
R116	*N5905-171-1998		5905-249-4248	
R117	*N5905-185-8510		5905-185-8518	
R118	N5905-114-3341			
R119	N5905-108-6483			
R121				
R122	*N5905-190-8880		5905-195-6809	3350-098000-3411
R123	N5905-257-0935			
R124	*N5905-171-2004		5905-279-2029	
R129	*N5905-190-8889		5905-186-3008	3350-098000-2271
R130				3350-
R132	*N5905-195-6453		5905-192-4408	
R133	*N5905-195-6800		5905-195-6799	3350-098000-2991
R201	N5905-264-7152			
R301	N5905-299-1541			3350-098000-2431
R302	N5905-279-1885			3350-098000-1731
R401	N5905-279-1760			3350-098000-1971
R402	N5905-279-2593			3350-098000-2631
R501	N5905-185-6731			3350-098000-1891
S101	N5930-548-5156			3360-
S103	N5930-050-2635			3360-395853000
T101	N5950-548-6995			3340-
T102	N5950-548-6699			3340-
T201	N5950-518-4457			3340-
TB101				8880-
V101	N5960-262-0210			5960-
V102	N5960-248-3089			5960-
V103	N5960-188-3899			5960-188-3899
V104	N5960-262-0185			5960-
V201	N5960-272-9182			5960-272-9182
V202	N5960-262-3763			5960-
W101				
W101A	N6145-195-7130			
W601				
W601A	*N5935-149-4066			
W601B	*N6145-161-0909			
W701				
XC202	*N5935-259-3995		5935-129-9358	8850-893950
XF101	N5920-636-1368			8870-588000-577

TABLE 7-2. (Continued)

REF. DESIG.	STOCK NUMBERS			
	FEDERAL	STANDARD NAVY	SIGNAL CORPS	USAF
XI101	N6210-299-4309			8870-
XV101	N5935-160-1365		5935-280-1332	8850-896590
XV102	*N5935-259-1944		5935-260-0516	8850-882880
XV103	N5935-258-8865			8850-873750
Z101				3330-
Z102	N5915-518-3343			3330-
Z301	N5905-518-7252			3350-
Z401	N5905-518-7251			3350-
Z501	N5915-547-1541			7CAA

TABLE 7-3. RF SIGNAL GENERATOR SET AN/URM-26B, STOCK NUMBER CROSS REFERENCE

FEDERAL	REF. DESIG.	FEDERAL	REF. DESIG.	FEDERAL	REF. DESIG.
5355-284-5670	E105	N3020-528-0585	O 105	N5910-114-2431	C101
5905-174-4801	R113	N5355-504-9991	N104	N5910-120-1675	C201
5905-185-8518	R117	N5355-518-0882	N101	N5910-270-5350	C102
5905-186-3008	R129	N5355-538-6329	N103	N5910-280-7185	C125
5905-190-8876	R126	N5905-108-6483	R119	N5910-280-9570	C126
5905-190-8882	R128	N5905-108-9718	R102	N5910-284-4046	C108
5905-192-3982	R107	N5905-114-3341	R118	N5910-643-8981	C130
5905-192-3987	R104	N5905-171-1998	R116	N5910-643-9303	C107
5905-192-4408	R132	N5905-171-2004	R124	N5910-644-0600	C203
5905-195-6799	R133	N5905-185-6731	R501	N5910-644-0634	C127
5905-195-6809	R122	N5905-185-8510	R117	N5910-666-7701	C202
5905-195-6817	R106	N5905-190-8880	R122	N5910-668-9336	C115
5905-249-4248	R116	N5905-190-8889	R129	N5910-668-9337	C110
5905-279-2029	R124	N5905-192-0390	R107	N5915-518-3343	Z102
5905-295-3410	R101	N5905-192-0649	R103	N5920-636-1368	XF101
5905-644-9502	R108	N5905-192-0667	R108	N5920-665-0976	F101
5910-100-8125	C109	N5905-195-6453	R132	N5930-050-2635	S103
5910-174-9953	C201	N5905-195-6761	R104	N5930-548-5156	S101
5910-280-8371	C130	N5905-195-6800	R133	N5935-149-3466	J201
5910-636-2105	C127	N5905-195-6806	R106	N5935-149-4066	W601A
5910-666-8856	C108	N5905-254-9201	R101	N5935-160-1365	XV101
5910-667-2329	C125	N5905-257-0935	R123	N5935-201-5983	J101
5915-547-1541	Z501	N5905-259-6294	R113	N5935-258-0604	E116
5920-199-9498	F101	N5905-264-7152	R201	N5935-258-8865	XV103
5935-129-9358	XC202	N5905-279-1760	R401	N5935-258-9768	J103
5935-149-3466	J201	N5905-279-1885	R302	N5935-259-1944	XV102
5935-260-0516	XV102	N5905-279-2593	R402	N5935-259-2748	P101
5935-280-1332	XV101	N5905-279-3514	R115	N5935-259-3995	XC202
5935-642-1003	J103	N5905-299-1541	R301	N5935-502-4717	E109
5940-549-2784	E109	N5905-518-7251	Z401	N5935-636-7145	P102
5960-296-4072	E102	N5905-518-7252	Z301	N5950-246-4380	L119
GF6240-223-9100	I 101	N5910-112-7451	C104	N5950-504-8878	L101
N3020-520-6617	O 102	N5910-114-2430	C109	N5950-518-3363	L116
N3020-520-6618	O 101			N5950-518-4457	T201
N3020-528-0583	O 103			N5950-538-6323	L114
N3020-528-0584	O 104			N5950-538-6324	L112
				N5950-538-6325	L111

TABLE 7-3. (Continued)

FEDERAL	REF. DESIG.	USAF	REF. DESIG.	USAF	REF. DESIG.
N5950-538-6326	L113	3320-292241388	E105		
N5950-538-6340	L115	3330-055475140	C130		
N5950-548-6699	T102	3330-056200546	C125		
N5950-548-6995	T101	3330-056550023	C102		
N5950-647-6603	L201	3330-056550033	C104		
N5960-188-3899	V103	3330-056750768	C203		
N5960-194-9408	CR101	3330-376050000	C109		
N5960-248-3089	V102	3340-060081580	L119		
N5960-262-0015	E104	3350-098000-1731	R302		
N5960-262-0185	V104	3350-098000-1851	R114		
N5960-262-0210	V101	3350-098000-1891	R501		
N5960-262-3763	V202	3350-098000-1971	R401		
N5960-264-3004	E101	3350-098000-2271	R129		
N5960-272-9182	V201	3350-098000-2431	R301		
N5960-390-5226	CR102	3350-098000-2511	R115		
N5960-669-6876	CR103	3350-098000-2631	R402		
N5960-669-8808	E102	3350-098000-2991	R133		
		3350-098000-3331	R106		
		3350-098000-3411	R122		
N6145-161-0909	W601B	3360-395853000	S103		
N6145-195-7130	W101A	5960-188-3899	V103		
N6210-299-4309	XI101	5960-262-0015	E104		
N6625-649-2050	M101	5960-264-3004	E101		
		5960-272-9092	E102		
STANDARD NAVY		5960-272-9182	V201		
		8850-100915	E116		
		8850-310593-52	P101		
		8850-479737	J103		
		8850-560158-52	J201		
		8850-873750	XV103		
		8850-882880	XV102		
SIGNAL CORPS		8850-893950	XC202		
		8850-896590	XV101		
		8870-185500-255	F101		
		8870-588000-577	XF101		
		8870-696000-725	I101		
		8880-118600-6755	E109		

TABLE 7-4. RF SIGNAL GENERATOR SET AN/URM-26B, LIST OF MANUFACTURERS

ABBREVIATION	NAME	ADDRESS
CABU	Superior Electric Co.	Bristol, Conn.
CALG	CBS-Hytron	Danvers, Mass.
CAN	Sangamo Electric Co.	Marion, Illinois
CBZ	Allen-Bradley Co.	Milwaukee, Wis.
CER	Erie Resistor Co.	Erie, Pa.
CFA	Bussman Mfg. Co.	St. Louis, Mo.
CG	General Electric Co.	Cleveland, Ohio
CIR	International Resistance Co.	Philadelphia, Pa.
CMA	P.R. Mallory & Co.	Indianapolis, Ind.
CMG	Cinch Mfg. Corp.	Chicago, Ill.
COM	Ohmite Mfg. Co.	Skokie, Ill.
CRP	Raytheon Mfg. Co.	Waltham, Mass.
CORNISH	Cornish Wire Co.	New York, N.Y.
ELECTRA	Electra Mfg. Co.	Kansas City, Mo.
TRAD	Trad Electronics Corp.	Asbury Park, N.J.

INDEX

SUBJECT	PARAGRAPH (*Figure*) *Table
A	
Accessory cable assemblies	(1-1)
Adjusting rf output voltage	3-5
Adjustments	2-3
Audio and metering section subassembly, general view	(6-7)
Audio and metering section terminal board, outside view	(5-4)
Audio oscillator (Principles of operation)	4-4*a*
Audio oscillator (Trouble-shooting and repair)	5-5*a*
Audio oscillator section, functional section trouble-shooting chart	*5-5
B	
Block Diagrams. (See List of Illustrations in FRONT MATTER.)	
Bottom view of audio and metering section sub-chassis	(6-8)
Bottom view of Power Supply PP-1215/URM-26B	(6-12)
C	
Checking the meter zero	3-3
Correct methods for terminating the signal generator at J101	*3-2
Coupling to equipment under test:	
General	3-9*a*
Equipment with input impedance of 50 ohms	3-9*b*
Equipment with input impedance less than 50 ohms	3-9*c*
Equipment with input impedance somewhat greater than 50 ohms	3-9*d*
Receiver input impedance considerably greater than 50 ohms	3-9*e*
CW operation	
General	4-2*a*
Carrier oscillator	4-2*b*
Frequency modulation compensation	4-2*c*
Carrier level measuring circuit	4-2*d*
Variable rf output attenuator	4-2*e*

SUBJECT	PARAGRAPH (*Figure*) *Table
D	
Decade checking	3-11*f*
Detailed description (of equipment)	1-3
Diagrams. (See List of Illustrations in FRONT MATTER.)	
Disassembly of rf attenuator	6-7
Disassembly procedures. (See Removing.)	
E	
Electron tube, crystal diode, fuse and indicator lamp complement	1-6, *1-2
Equipment similarities	1-5
Equivalent circuit of output of signal generator with (10:1) fixed attenuator CN-316/URM-26B	(3-8)
Equivalent circuit of rf oscillator with frequency modulation compensator	(4-3)
Equivalent circuit of rf output with series matching resistor added	(3-5)
Equivalent circuit of rf output with shunt resistor added	(3-6)
External modulation circuit	4-5
External pulse modulation	3-8
External sine wave modulation	3-7
F	
Failure Report	6-1
Frequency calibration data	*6-2
Frequency modulation compensation	4-2*c*
Front panel view for removal of RF Signal Generator SG-117/URM-26B from case	(6-1)
Functional section trouble-shooting and repair:	
Power Supply PP-1215/URM-26B	5-5*a*
Audio oscillator	5-5*b*
Modulator	5-5*c*
Pulse modulator	5-5*d*
RF oscillator	5-5*e*
Fuse failure	5-2*b*
Fuse locations	*5-3

SUBJECT	PARAGRAPH (Figure) *Table
G	
General description of circuits	4-1
General instructions for use and supplementary data	3-14
I	
Installation	2-2
Interior view of (2:1) Fixed Attenuator CN-315/URM-26B	6-14
Interior view of (10:1) Fixed Attenuator CN-316/URM-26B	6-15
Interior view of Impedance Matching Network CU-439/URM-26B	6-13
Internal modulation circuit:	
Audio oscillator	4-4*a*
Modulator	4-4*b*
% modulation circuit	4-4*c*
Internal sine wave modulation	3-6
L	
List of manufacturers	7-5
Lubrication	5-2*c*
M	
Maintenance parts list	7-2
Metering crystal pickup mount	5-7
Method of inserting Attenuator and Matching Network Between Signal Generator and Receiver	3-9
Modulation and pulse transformers, and filters	5-5
Modulation section, functional section trouble-shooting chart	*5-6
Modulator	4-4*b*
Modulator (trouble-shooting and repair)	5-5*c*
O	
Operational summary of front panel controls	*3-1
Oscillator coil turret top and bottom views	(6-4)
Oscillator hookup to observe pulse waveform	(4-6)
Oscilloscope hookup to observe rf output	(5-8)
P	
Percentage modulation chart	(6-10)
Periodic testing	5-2
Performance standards	5-3
Power circuit	3-2
Power Supply PP-1215/URM-26B	4-7
Power Supply PP-1215/URM-26B, functional section trouble-shooting chart	*5-4
Power Supply PP-1215/URM-26B (functional trouble-shooting and repair)	5-5*a*
Power supply, with chassis folded flat, and line filter assembly	(5-1)
Precautions (Internal sine wave modulation)	3-6*a*
Procedure (Internal sine wave modulation)	3-6*b*
Pulse limiter	4-3*b*
Pulse modulator (functional trouble-shooting and repair)	5-5*d*
Pulse modulator, functional section trouble-shooting chart	*5-7
Pulse transformer	4-3*a*
Purpose and basic principles	1-2
R	
Rear view for removal of Power Supply PP-1215/URM-26B from case	(6-2)
Rear view of Signal Generator SG-117/URM-26B	(6-3)
Recalibrating microvolts output	6-11
Recalibrating percentage modulation	6-12
Recalibrating rf oscillator	6-10
Recalibration setup	(6-9)
Receiver impedance (different values)	3-9, 3-11, 3-12
Receiver tests	3-14*b*
Reference data	1-4
Removal and replacement of parts	6-4
Removing and replacing rf oscillator components:	
Removing rf oscillator cover plate	6-5*a*
Removing rf oscillator tube V103	6-5*b*
Removing coil turret	6-5*c*
Removing tuning capacitor	6-5*d*
Removing a coil from the turret	6-5*e*
Removing metering crystal pickup mount	6-5*f*
Removing audio compartment	6-9
Removing low-pass filter subassembly	6-8
Removing rf attenuator	6-6
Removing Power Supply PP-1215/URM-26B	6-3*b*
Removing the signal generator and power supply from the case	6-3
RF oscillator and variable capacitor sub-assembly	(6-5)
RF oscillator section, functional section trouble-shooting chart	*5-8
RF oscillator stage showing test points and wiring	(5-6)
RF Signal Generator Set AN/URM-26B, complete equipment	(1-1)
RF Signal Generator Set AN/URM-26B, equipment supplied	*1-1
RF Signal Generator Set AN/URM-26B, functional block diagram	(4-1)

SUBJECT	PARAGRAPH (Figure) *Table
RF Signal Generator Set AN/URM-26B, list of manufacturers	*7-4
RF Signal Generator Set AN/URM-26B, maintenance parts list	*7-1
RF Signal Generator Set AN/URM-26B, outline dimensions	(2-2)
RF Signal Generator Set AN/URM-26B, overall schematic	(6-16)
RF Signal Generator Set AN/URM-26B, stock number cross reference	*7-3
RF Signal Generator Set AN/URM-26B, stock number identification and list of parts supplied	*7-2
RF Signal Generator Set AN/URM-26B, unpacking procedure	(2-1)
Routine check chart	*5-1
Routine maintenance check chart	5-2*a*
S	
Schematic diagram of Impedance Matching Network, CU-439/URM-26B	(3-7)
Schematic diagram of Power Supply PP-1215/URM-26B	(4-10)
Simplified procedure for operating RF Signal Generator Set AN/URM-26B	(3-10)
Simplified schematic diagram of the audio oscillator set for 1000 cycle operation	(4-7)
Simplified schematic diagram of the modulation amplifier and % modulation meter circuit	(4-8)
Simplified schematic diagram showing external modulation	(4-9)
Simplified schematic diagram showing pulse limiter and rf oscillator stages when switched to PULSE position	(4-5)
Simplified schematic diagram of the rf oscillator set at Band C (17-38 mc)	(4-2)
Simplified schematic of the waveguide-below-cutoff attenuator and rf level monitoring	(4-4)
Scope	1-1
Setting the carrier frequency	3-4
Signal Generator Set SG-117/URM-26B, front panel	(3-1)
Signal generator voltage and resistance chart	(5-9)
Standard level	3-14*c*
Steps in operation	3-13*b*
Stock number cross reference	7-4
Stock number identification and list of part supplied	7-3
Symptoms of fuse failure	*5-2
T	
Terminating the signal generator	4-6
Test equipment required for making repairs and trouble-shooting	5-4
Test points; audio oscillator, modulator and pulse circuits with chassis folded back	(5-2)
Top view of Power Supply PP-1215/URM-26B	(6-11)
Trouble symptom chart	*6-1
Tube socket electrical measurements	5-6
Tuning and adjustment	6-2
Typical troubles	*5-9, 5-7
U	
Unpacking	2-1
Use of Fixed Attenuator CN315/URM-26B (6 db pad)	3-12
Use of Fixed Attenuator CN-316/URM-26B (20 db pad)	3-11
Use of Impedance Matching Network CU-439/URM-26B	3-10
V	
Variable rf output attenuator	4-2*e*
Voltmeter used as an output meter	3-14*d*
W	
Waveguide-below-cut-off attenuator cut-away view, showing internal construction	(6-6)
Wiring diagram, audio oscillator, modulator and pulse circuits with chassis folded back	(5-3)